FIELD CROP ABSTRACTS

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CURRENT AGRICULTURAL RESEARCH IN AFRICA ON ANNUAL FIELD CROPS AND GRASSLANDS (continued)

In each of the numbers of this volume of *Field Crop Abstracts*, brief details (obtained from replies to questionnaires) will be published of those agricultural research institutes and experiment stations in Africa which are concerned with annual field crops, grasslands and fodder crops. Countries are arranged in alphabetical order. For each station, under the heading *Principal lines of research*, the numbers (1), (2), (3), (4) and (5) refer to : (1) Annual field- or fodder-crops (including cassava), (2) Grass or grass/legume mixtures, (3) Natural grasslands, (4) Farming systems, and (5) Other lines of research concerned with grasslands, fodders or annual field crops (except tobacco). The maximum and minimum shade temperatures relate to 1958 only.

SOUTH AFRICA, REPUBLIC OF

Athole, Agricultural Research Station

Location : 30 miles E. of Ermelo, Transvaal, on the edge of the highveld escarpment. Lat. 26° 40′ S. Long. 30° 35′ E. Alt. 4800 ft.
Met. data : Rainfall 34 in. (duration of dry season 14 weeks). Max. shade temp. 90·0°F. Min. shade temp. 25·7°F.
Size of station : 2000 acres.
Number of graduate research workers on staff : Controlled from Nooitgedacht.
Principal lines of research :
(1) Fodder legumes : fertilizer trials.
(2) Grass/legume mixtures, *Acrocerus macrum*, *Paspalum urvillei*, clover pastures : fertilizer trials.
(3) Veld : fertilizer trials.

Barberton, Agricultural Research Station

Location : Barberton, in the E. Transvaal lowveld. Lat. 25° 50′ S. Long. 31° E. Alt. 2532 ft.
Met. data : Rainfall 31 in. (duration of dry season 18 weeks). Max. shade temp. 101·1°F. Min. shade temp. 32°F.
Size of station : 482 acres (arable, 192 ; veld, 290).
Number of graduate research workers on staff : 2.
Principal lines of research :
(1) Cotton : breeding, fertilizer trials.
(2) Comparison of perennial grasses.
(4) Crop rotation studies.

Bestersput, Agricultural Research Station

Location : Petrusburg, Orange Free State. Lat. 29° 10′ S. Long. 25° 20′ E. Alt. 4200 ft.
Met. data : Rainfall 18 in. (duration of dry season 20 weeks). Max. shade temp. 98°F. Min. shade temp. 20°F.
Size of station : 6000 acres.
Number of graduate research workers on staff : Controlled from Glen.
Principal lines of research :
(3) Veld management : control of the undesirable invading plant *Chrysocoma tenuifolia*.

Bethlehem, Agricultural Research Station

Location : Bethlehem, in the Orange Free State highveld. Lat. 28° S. Long. 28° E. Alt. 4700 ft.
Met. data : Rainfall 27 in. (duration of dry season 20 weeks). Max. shade temp. 90·1°F. Min. shade temp. 18·5°F.
Size of station : 2200 acres (arable, 1300 ; veld, 900).
Number of graduate research workers on staff : 5.
Principal lines of research :
(1) Wheat : varietal, breeding, seed-rate, spacing and fertilizer trials. Oats : varietal and spacing trials. Maize : varietal, breeding, sowing-date, spacing and fertilizer trials. Cowpeas : varietal trials. Potatoes : fertilizer trials.
(2) *Eragrostis curvula* and *Phalaris tuberosa* : fertilizer trials.
(3) Veld : fertilizing and management.
(4) Crop rotation studies. Ley studies.

Cedara, College of Agriculture and Experiment Farm

Location : Cedara, Natal. Lat. 29° 30′ S. Long. 30° 20′ E. Alt. 3451 ft.
Met. data : Rainfall 35 in. (duration of dry season 10 weeks). Max. shade temp. 96·8°F. Min. shade temp. 22·8°F.
Size of station : 2400 acres (arable, 900 ; veld, 1500).
Number of graduate research workers on staff : 8.
Principal lines of research :
(1) Maize : spacing and fertilizer trials. Potato : fertilizer trials.
(2) Grass/legume mixtures, *Pennisetum clandestinum* (Kikuyu grass), clover varieties : fertilizer trials. Comparison of perennial grasses.
(3) Veld management. Ecological studies.
(4) Crop rotation systems.

Dohne, Agricultural Research Station

Location : Dohne, E. Cape Province. Lat. 32° 30′ S. Long. 27° 25′ E. Alt. 2950 ft.
Met. data : Rainfall 28 in. (duration of dry season 20 weeks). Max. shade temp. 98·6°F. Min. shade temp. 30·7°F.
Size of station : 2480 acres.
Number of graduate research workers on staff : 3.
Principal lines of research :
(1) Potato research.
(2) Lucerne : fertilizer trials.
(3) Veld : fertilizing and management.

Estcourt, Agricultural Research Station

Location : Estcourt, Natal. Lat. 29° S. Long. 29° 50′ E. Alt. 3800 ft.
Met. data : Rainfall 29 in. (duration of dry season 16 weeks). Max. shade temp. 95·7°F. Min. shade temp. 27·5°F.
Size of station : 500 acres.
Number of graduate research workers on staff : 2.
Principal lines of research :
(3) Veld management and burning. Rotational grazing systems.

Glen, College of Agriculture and Experiment Farm

Location : Glen, Orange Free State. Lat. 29° S. Long. 26° 20′ E. Alt. 4279 ft.
Met. data : Rainfall 23 in. (duration of dry season 20 weeks). Max. shade temp. 98·1°F. Min. shade temp. 16·0°F.
Size of station : 6000 acres (arable, 500 ; veld, 5500).
Number of graduate research workers on staff : 9.
Principal lines of research :
(1) Wheat : fertilizer trials. Maize : varietal, spacing and fertilizer trials. Sorghum : spacing trials. Cowpeas : varietal trials. Silage crops.
(2) Annual hay grasses. Comparison of perennial grasses and also of grass/legume mixtures. Ley studies. *Eragrostis curvula* : fertilizer trials.
(3) Veld : fertilizer trials ; veld hay.
(4) Crop rotation systems.

Grootfontein, College of Agriculture and Experiment Farm
Location : Middelburg, Karoo region, Cape Province. Lat. 31° 30′ S. Long. 25° E. Alt. 4142 ft.
Met. data : Rainfall 14 in. (duration of dry season 24 weeks). Max. shade temp. 95·4°F. Min. shade temp. 13·6°F.
Size of station : 22,000 acres.
Number of graduate research workers on staff : 8.
Principal lines of research :
(1) Wheat and maize : fertilizer trials.
(2) Lucerne breeding. *Festuca elatior* : fertilizer trials. Comparison of grass/legume mixtures ; irrigation requirements ; breeding and selection of strains of perennial grasses and clovers.
(3) Comparison of different rotational grazing systems. Ecological studies.
(4) Crop rotation studies.

Koolbank, Agricultural Research Station
Location : Near Ermelo, in the E. Transvaal highveld. Lat. 26° 40′ S Long. 30° 35′ E. Alt. 4800 ft.
Met. data : Rainfall 34 in. (duration of dry season 18 weeks). Max. shade temp. 86°F. Min. shade temp. 21°F.
Size of station : 1000 acres.
Number of graduate research workers on staff : Controlled from Nooitgedacht.
Principal lines of research :
(2) Field trials of grasses and pasture legumes.

Koopmansfontein, Agricultural Research Station
Location : Koopmansfontein, Griqualand West, N. Cape Province. Lat. 28° 20′ S. Long. 24° E. Alt. 4400 ft.
Met. data : Rainfall 12·5 in. (duration of dry season 32 weeks). Max. shade temp. 97·2°F. Min. shade temp. 17·6°F.
Size of station : 8000 acres.
Number of graduate research workers on staff : 2.
Principal lines of research on :
(3) Veld management. Rotational grazing systems. Control of the poisonous plant *Geigeria africana*.

Langgewens, Agricultural Research Station
Location : S.W. Cape Province, in the drier " Swartland " portion of the winter-rainfall area. Lat. 33° 20′ S. Long. 18° 40′ E. Alt. 298 ft.
Met. data : Rainfall 14·5 in. (duration of dry season 26 weeks). Max. shade temp. 106·7°F. Min. shade temp. 35·6°F.
Size of station : 1010 acres.
Number of graduate research workers on staff : Controlled from Stellenbosch.
Principal lines of research :
(1) Wheat, oats, barley : varietal trials. Wheat : fertilizer trials.

Losperfontein, Agricultural Research Station
Location : Hartebeespoort Irrigation Scheme, Nr. Brits, Transvaal. Lat. 25° 40′ S. Long. 27° 40′ E. Alt. 3300 ft.
Met. data : Rainfall 22·5 in. (duration of dry season 20 weeks). Max. shade temp. 98·2°F. Min. shade temp. 14·9°F.
Size of station : 800 acres (arable, 320 ; veld, 480).
Number of graduate research workers on staff : Controlled from Agric. Res. Inst., Pretoria.
Principal lines of research :
(1) Wheat : varietal and fertilizer trials.
(4) Crop rotation systems.

Mara, Agricultural Research Station
Location : W. of Louis Trichardt, in the N. Transvaal bushveld. Lat. 23° 10′ S. Long. 29° 30′ E. Alt. 2998 ft.
Met. data : Rainfall 16 in. (duration of dry season 22 weeks). Max. shade temp. 103·1°F. Min. shade temp. 32·0°F.
Size of station : 24,000 acres.
Number of graduate research workers on staff : Pasture studies controlled from Agric. Res. Inst., Pretoria.
Principal lines of research :
(3) Veld ecological studies. This station is chiefly used for animal husbandry research.

Messina, Agricultural Research Station
Location : Messina, in the N. Transvaal Mopane (*Colophospermum mopane*) bushveld. Lat. 22° 20′ S. Long. 29° 50′ E. Alt. 1700 ft.
Met. data : Rainfall 14 in. (duration of dry season 28 weeks). Max. shade temp. 110·1°F. Min. shade temp. 32·0°F.
Size of station : 20,000 acres.
Number of graduate research workers on staff : Pasture studies controlled from Agric. Res. Inst., Pretoria.
Principal lines of research :
(3) Veld ecological studies. This station is chiefly used for animal husbandry research.

Nooitgedacht, Agricultural Research Station
Location : Ermelo, in the E. Transvaal highveld. Lat. 26° 30′ S. Long. 30° E. Alt. 5700 ft.
Met. data : Rainfall 28 in. (duration of dry season 20 weeks). Max. shade temp. 85·3°F. Min. shade temp. 20·7°F.
Size of station : 1700 acres (arable, 400 ; veld, 1300).
Number of graduate research workers on staff : 4.
Principal lines of research :
This station has only recently become available for agronomic and pasture research. It will mainly serve sheep- and dairy-farmers.

Outeniqua, Agricultural Research Station
Location : George, in the S. coastal area of Cape Province. Lat. 34° S. Long. 22° 25′ E. Alt. 724 ft.
Met. data : Rainfall 34 in. (no dry season). Max. shade temp. 94·5°F. Min. shade temp. 34·9°F.
Size of station : 600 acres.
Number of graduate research workers on staff : 2.
Principal lines of research :
(1) Potatoes : varietal and fertilizer trials.
(2) Grass/clover mixtures. Lucerne : fertilizer trials.

Pietermaritzburg, Agricultural Research Institute and Ukulinga Experiment Farm
Location : Pietermaritzburg, Natal. Lat. 29° 40′ S. Long. 30° 20′ E. Alt. 2500 ft.
Met. data : Rainfall 35 in. (duration of dry season 12 weeks). Max. shade temp. 100·9°F. Min. shade temp. 37·6°F.
Size of station : 500 acres.
Number of graduate research workers on staff : 14.
Principal lines of research :
(1) Maize : spacing and fertilizer trials. Cotton : varietal and fertilizer trials.
(2) Ley studies. Comparison of perennial grasses.
(3) Veld : fertilizer trials, burning and hay.
(4) Crop rotation studies.

Potchefstroom, College of Agriculture and Experiment Farm
Location : Potchefstroom, in the Transvaal highveld. Lat. 27° S. Long. 27° E. Alt. 4440 ft.
Met. data : Rainfall 24 in. (duration of dry season 20 weeks). Max. shade temp. 95·0°F. Min. shade temp. 20·7°F.
Size of station : 4800 acres (arable, 800 ; veld, 4000).
Number of graduate research workers on staff : 17.
Principal lines of research :
(1) Wheat : breeding, varietal and fertilizer trials. Maize : breeding, varietal, spacing, soil management, and fertilizer trials. Sorghums : breeding. Cowpeas : breeding, seed-rate, spacing, seed-production trials. Soyabeans : breeding, spacing, sowing-depth trials. Groundnuts : breeding, spacing and fertilizer trials. Sunflower : breeding and fertilizer trials.
(2) Grass/legume mixtures, *Cenchrus ciliaris, Digitaria smutsii, Eragrostis curvula* : fertilizer trials. *Sorghum almum, D. smutsii, C. ciliaris*, Bana grass (*Pennisetum typhoides* × *P. purpureum*) : spacing trials. *P. typhoides* and lucerne : breeding.

(3) Fertilizer and management trials, ecological studies.
(4) Crop rotation studies.
(5) Wheat, maize, sorghum, groundnuts : herbicidal trials. *Cyperus rotundus* : chemical control.

Pretoria, Agricultural Research Institute and Experiment Farm
Location : Pretoria, Transvaal. Lat. 25° 45′ S. Long. 28° 15′ E. Alt. 4500 ft.
Met. data : Rainfall 28 in. (duration of dry season 20 weeks). Max. shade temp. 90°F. Min. shade temp. 24°F.
Size of station : 1500 acres.
Number of graduate research workers on staff : 13.
Principal lines of research :
(1) Wheat : irrigation, varietal and fertilizer trials. Maize : irrigation, breeding, fertilizer and spacing trials. Sorghum : breeding. Groundnuts : breeding, irradiation of seed to increase resistance to rosette disease. Potatoes : fertilizer trials. Sunflower : breeding.
(2) Grass/lucerne mixtures, *Digitaria smutsii*, *Eragrostis curvula*, *Setaria sphacelata* : fertilizer trials. Ley studies. Comparison of perennial grasses.
(3) Veld fertilization and burning.
(4) Crop rotation studies.
(5) Herbicidal trials.

Rictondale, Agricultural Research Station
Location : Pretoria, Transvaal. Lat. 25° 45′ S. Long. 28° 15′ E. Alt. 4300 ft.
Met. data : Rainfall 28 in. (duration of dry season 20 weeks). Max. shade temp. 91·1°F. Min. shade temp. 29·5°F.
Size of station : 354 acres (arable, 200 ; veld, 154).
Number of graduate research workers on staff : 4.
Principal lines of research :
(2) Introduction and selection of forage crops. Breeding and improvement work with the following: *Trifolium* spp. (exotic and indigenous), *Setaria sphacelata*, *Digitaria* spp., *Themeda triandra*. Grass root studies using radioactive-labelled fertilizers.
(5) A physiological study of the poisonous weed *Geigeria africana* which is a problem in the Griqualand West area served by the Koopmansfontein Agric. Res. Sta.

Rietrivier, Agricultural Research Station
Location : Rietrivier Irrigation Scheme, N. Cape Province. Lat. 29° 10′ S. Long. 24° 40′ E. Alt. 3740 ft.
Met. data : Rainfall 14 in. (duration of dry season 22 weeks). Max. shade temp. 98·2°F. Min. shade temp. 19·2°F.
Size of station : 1080 acres (arable, 900 ; veld, 180).
Number of graduate research workers on staff : 2.
Principal lines of research :
(1) Cotton : varietal and spacing trials.
(2) Lucerne : breeding and fertilizer trials.

Rietvlei, Agricultural Research Station
Location : Pretoria, Transvaal. Lat. 25° 50′ S. Long. 28° 20′ E. Alt. 5000 ft.
Met. data : Rainfall 27 in. (duration of dry season 20 weeks). Max. shade temp. 90·3°F. Min. shade temp. 22·3°F.
Size of station : 1400 acres (arable, 340 ; veld, 1060).
Number of graduate research workers on staff : Controlled from Div. of Crops and Pastures, Pretoria.
Principal lines of research :
(1) Vetch as a green manure crop for maize.
(2) Grass seed production.
(3) Veld fertilization. A statistical study of plant pattern changes.
(5) The effect of 2,4-D on the production of summer wheat.

Roodeplaat, Agricultural Research Station
Location : Pienaar's river dam, 16 miles N.E. of Pretoria, Transvaal. Lat. 25° 40′ S. Long. 26° 20′ E. Alt. 3901 ft.
Met. data : Rainfall 28 in. (duration of dry season 20 weeks). Max. shade temp. 97·3°F. Min. shade temp. 25·9°F.
Size of station : 5000 acres (arable, 1000 ; veld, 4000).
Number of graduate research workers on staff : 1.
Principal lines of research :
(1) Wheat: breeding and selection, sowing-date trials.

Springfontein, Agricultural Research Station
Location : Near Kokstad, Griqualand East, Natal. Lat. 30° 20′ S. Long. 29° 10′ E. Alt. 4800 ft.
Met. data : Rainfall 28 in. (duration of dry season 12 weeks). Max. shade temp. 94·6°F. Min. shade temp. 17·6°F.
Size of station : 2000 acres (arable, 600 ; veld, 1400).
Number of graduate research workers on staff : Controlled from Pietermaritzburg.
Principal lines of research :
(2) Grass/legume mixtures : fertilizer trials and studies of different mixtures.

Stellenbosch-Elsenburg, Agricultural College and Research Institute
Location : S.W. Cape Province, in the winter rainfall area. Lat. 33° 50′ S. Long. 18° 50′ E. Alt. 594 ft.
Met. data : Rainfall 24·6 in. (duration of dry season 16 weeks). Max. shade temp. 100·8°F. Min. shade temp. 36·9°F.
Size of station : 2500 acres.
Number of graduate research workers on staff : 16.
Principal lines of research :
(1) Wheat : breeding, varietal and fertilizer trials. Oats : breeding and varietal trials. Rye : breeding. Barley : breeding and varietal trials. Lupins : breeding and fertilizer trials. Oil-seed flax : varietal trials.
(2) Breeding and selection of *Medicago*, *Melilotus* and *Trifolium*.
(4) Crop rotation studies.

Tabamhlope, Agricultural Research Station
Location : Slopes of Drakensberg mountains, S.W. of Estcourt, Natal. Lat. 29° 10′ S. Long. 29° 40′ E. Alt. 5000 ft.
Met. data : Rainfall 45 in. (duration of dry season 22 weeks).
Size of station : 1000 acres.
Number of graduate research workers on staff : Controlled from Estcourt.
Principal lines of research :
(1) Maize : fertilizer trials.
(3) Veld burning.
(4) Rehabilitation of old abandoned lands.

Towoomba, Agricultural Research Station
Location : Warmbaths, N. Transvaal. Lat. 24° 50′ S. Long. 28° 20′ E. Alt. 3845 ft.
Met. data : Rainfall 25 in. (duration of dry season 20 weeks). Max. shade temp. 97·7°F. Min. shade temp. 25·5°F.
Size of station : 1400 acres (arable, 300 ; veld, 1100).
Number of graduate research workers on staff : 2.
Principal lines of research :
(1) Wheat : varieties studied at Rust-der-Winter and Loskop irrigation schemes. Maize, sorghum, groundnuts : spacing and fertilizer trials. Cowpeas, soyabeans, groundnuts, mung beans, sunflower : varietal trials.
(2) *Panicum coloratum* and *Cenchrus ciliaris* : fertilizer trials.
(3) Veld fertilization.
(4) Crop rotation study (including the grazing animal).

Upington, Agricultural Research Station
Location : Upington, on the banks of the Orange river, N. Cape Province. Lat. 28° 30′ S. Long. 21° 20′ E. Alt. 2598 ft.

Met. data : Rainfall 8 in. (duration of dry season 36 weeks). Max. shade temp. 105·3°F. Min. shade temp. 25·5°F.
Size of station : 29,000 acres (arable, 100; veld, 28,900).
Number of graduate research workers on staff : 2.
Principal lines of research :
(1) Potato production. Cotton : breeding, varietal, fertilizer and irrigation trials.
(2) Lucerne : fertilizer and irrigation trials.
(4) Crop rotation systems.

Vaalharts, Agricultural Research Station
Location : Vaalharts Irrigation Scheme, N. Cape Province. Lat. 28° S. Long. 24° 50′ E. Alt. 3800 ft.
Met. data : Rainfall 18 in. (duration of dry season 24 weeks). Max. shade temp. 100°F. Min. shade temp. 21·2°F.
Size of station : 10,600 acres (arable, irrigated, 600 ; veld, 10,000).
Number of graduate research workers on staff : 3.
Principal lines of research :
(1) Wheat : sowing-rate, sowing-date, varietal and fertilizer trials. Maize, groundnuts : fertilizer trials. Cotton : spacing and fertilizer trials.
(2) Lucerne : establishment trials ; residual effects.
(4) Crop rotation studies.

SOUTHERN RHODESIA

Gatooma, Research Station
Location : 2 miles N. of Gatooma. Lat. 15° 20′ S. Long. 29° 55′ E. Alt. 3800 ft.
Met. data : Rainfall 28–32 in. (duration of dry season 24–28 weeks). Max. shade temp. 98°F. Min. shade temp. 38°F.
Size of station : 800 acres.
Number of graduate research workers on staff : 5.
Principal lines of research :
(1) Maize : varietal and cob-rot trials. Sorghum : varietal trials. Cotton : breeding, agronomy, pest control.
(2) Lucerne : varietal trials.
(4) Rotation trials with maize, cotton, legumes for green manure.

Gwebi, Agricultural College
Location : 18 miles N.W. of Salisbury. Lat. 17° 50′ S. Long. 31° 0′ E. Alt. 4857 ft.
Met. data : Rainfall 32·37 in. Max. shade temp. 91·8°F. Min. shade temp. 32·0°F.
Size of station : 3600 acres.
Number of graduate research workers on staff : 9.
Principal lines of research :
(1) Wheat, maize, potatoes : varietal, spacing and fertilizer trials. Management of annual crops after grass leys.
(2) Study of selected non-exotic grasses for improved pastures. Testing for growth, protein and fibre variations. Exotic legumes and winter grasses.
(3) General management and fertilization. Testing for growth, palatability and botanical changes of the sward under intensive management.

Henderson, Research Station
Location : 18 miles N. of Salisbury. Lat. 17·5° S. Long. 31° E. Alt. 4300–5000 ft.
Met. data : Rainfall 35 in. (duration of dry season 20 weeks). Max. shade temp. 94°F. Min. shade temp. 30°F.
Size of station : 4500 acres.
Number of graduate research workers on staff : 9.
Principal lines of research :
(1) Maize, winter wheat and winter barley, lucerne, potatoes, cotton : varietal, sowing-date, spacing, fertilizer trials (dryland and irrigated).
(2) Selection, establishment and management of grass and legume species suitable for hay, silage and grazing (dryland and irrigated).
(3) Management of veld and vleis for grazing.
(4) 300-acre costed tenant farm for milk and maize production. Beef weaner production from cows on a forage sequence of sown pastures, veld and vleis. Beef slaughter-stock production on a forage sequence of veld, sown pastures, annual and perennial legumes and maize supplements. Seasonal milk production from cows on a forage sequence of dryland sown pastures, annual and perennial legumes, vleis and maize supplements.
(5) Measurement of water, soil and fertility losses by erosion from arable lands under improved pastures and annual cash and fodder crops. Influence of season on the nitrogen behaviour in various grasses. Evaluation of seasonal changes in composition and digestibility of both natural and cultivated pastures. Studies of the influence of herbage composition and digestibility on intake by ruminants. Evaluation of various available protein sources, including non-protein nitrogen, for correcting protein deficit in animal diets.

Marandellas, Grasslands Research Station
Location : 3·5 miles N.W. of Marandellas, serving the granitic sandy soils in the high-rainfall region of the N.E. Lat. 18° 11′ S. Long. 31° 30′ E. Alt. 5175–5465 ft.
Met. data : Rainfall 36·14 in. (duration of dry season *c.* 35 weeks). Max. shade temp. 88·9°F. Min. shade temp. 32·2° F.
Size of station : 6650 acres.
Number of graduate research workers on staff : 6.
Principal lines of research :
(1) Maize, soyabeans, groundnuts and potatoes : with particular reference to the development of a system of ley-farming.
(2) Culture of pasture and fodder grasses and legumes, with particular reference to the development of a system of ley farming. Growth and development studies of tropical grasses. Development of grass/legume mixtures for irrigated pastures.
(3) Development of systems of grazing management for the natural grasslands. Integration of wet-season use of natural grazing with dry-season use of fodders from the ley-farming system being developed. Studies of scrub and bush control.
(4) Development of a system of ley farming. Assessment of effects of such a system upon soil productivity.
(5) Development of efficient strains of *Rhizobia* for use with legumes. Studies of animal agronomy for the ley system being developed. Development and assessment of irrigated pastures for the region.

Matopos, Research Station
Location : Nr. Bulawayo. Lat. 20° 24′ S. Long. 28° 29′ E. Alt. 4500 ft.
Met. data : Rainfall ± 23 in. (duration of dry season 26–28 weeks). Max. shade temp. 99·4°F. Min. shade temp. 21·2°F.
Size of station : *c.* 24,500 acres.
Number of graduate research workers on staff : 10.
Principal lines of research :
(1) Maize-, sorghum-, and millet-silage and legume hays (velvet beans, *Dolichos*, cowpeas, soyabeans), under dryland and supplemental summer irrigation : field and digestibility trials.
(2) Establishment and management of dryland and irrigated pastures (which include grass/legume mixtures). Lucerne production both under dryland conditions and irrigation.
(3) Management of natural vegetation with particular reference to bush control, carrying capacity and the effects of fire.
(5) A study of the effects of climatic factors on the production of the main fodder crops.

Melsetter, Pasture Station
Location : On the eastern border. Lat. 19° 48′ S. Long. 32° 52′ 30″ E. Alt. 4800–6000 ft.

Met. data : Rainfall 45·24 in. (duration of dry season 24–28 weeks). Max. shade temp. 89·0°F. Min. shade temp. 38·6°F.
Size of station : 1400 acres.
Number of graduate research workers on staff : 1.
Principal lines of research :

(1) Potatoes : varietal, fertilizer and blight-resistance trials.

(2) Introduction and trial of promising species. Grass/clover pastures under natural rainfall (summer). Irrigated pastures and foggage grazing (dry season).

(3) Minor ecological studies.

(5) Production of milk, mutton and wool from established pastures.

Nyamandhlovu, Pasture Sub-station
Location : Nr. Nyamandhlovu. Lat. 19° 56′ S. Long. 28° 29′ E. Alt. 4000 ft.
Met. data : Rainfall ± 20 in. (duration of dry season 26–28 weeks). Max. shade temp. 99·2°F. Min. shade temp. 27·2°F.
Size of station : *c.* 5000 acres.
Number of graduate research workers on staff : 1.
Principal lines of research :

(1) Maize-, sorghum-, and millet-silage, and legume hays (velvet beans, *Dolichos*, cowpeas, soyabeans) under dryland conditions : field and digestibility trials.

(2) Establishment and management of dryland pastures.

(3) Management of natural vegetation : bush control, carrying capacity, and the effects of fire.

(5) A study of the effects of climatic factors on the production of the main fodder crops.

Sabi Valley, Experiment Station
Location : S.E. corner of country ; 100 miles S. of Umtali and 20 miles S.E. of Chipinga. Lat. 20° 21′ S. Long. 32° 20′ E. Alt. 1450 ft.
Met. data : Rainfall 22 in. (duration of dry season 24 weeks). Max. shade temp. 106°F. Min. shade temp. 36°F.
Size of station : 300 acres.
Number of graduate research workers on staff : 3.
Principal lines of research :

(1) Wheat, barley, maize, cotton, other fibre crops and oil seeds : establishment, cultivation, water and fertilizer requirements.

(4) Systems including lucerne followed by annual crops as above and also sugar-cane.

Salisbury, Agricultural Experiment Station
Location : Salisbury. Lat. 17° 45′ 40″ S. Long. 31° 00′ 40″ E. Alt. 4900 ft.
Met. data : Rainfall 32 in. (duration of dry season 30–32 weeks). Max. shade temp. 93°F. Min. shade temp. 35°F.
Size of station : 70 acres.
Number of graduate research workers on staff : 5.
Principal lines of research :

(1) Wheat : breeding suitable varieties for growing both in winter and summer and testing introductions from other countries. Maize : breeding single and double hybrids. Potatoes : testing introduced varieties. Wheat, maize, cowpeas, soyabeans, groundnuts, velvet beans, potatoes, sweet-potatoes, kenaf, sunflowers and sunnhemp : agronomic trials.

(2) The residual effect on the soil, and on the growth and yields of subsequent field crops, of various treatments of grass leys.

(4) The testing of various rotation systems ; the rotation value of field crops ; the practice of green manuring ; various ways of using the stover from maize.

FIELD CROPS

CEREALS

WHEAT

See also Abs. 1080, 1085, 1471.

1029 Curtis, D. L. **A brief summary of the Northern Nigerian wheat survey 1959-60.** *News Lett. Min. Agric. N. Reg. Nigeria* 1960, No. 25, 5–6.

The summary includes a description of the ecological conditions of the wheat-growing areas of the Northern Provinces, methods of cultivation, general agronomy and use of the crop (mainly durum types).—R.H.F.

1030 Idia. La producción triguera argentina. [**Wheat production in Argentina.**] *Idia* 1960, No. 147, 1–6.

1031 Harper, H. J. **A 17-year comparison of four methods of tillage for winter wheat in a rotation.** *Bull. B-535 Okla. agric. Exp. Sta.* 1960, pp. 15, illus.

Four methods of primary tillage (the first tillage after harvesting the preceding crop) used in preparing a seed-bed for winter wheat were compared during 1941–57. The wheat was grown in a 5-year rotation with spring oats and sweet-clover. Average wheat yields (bu/ac) were : ploughed, 19·8 ; sub-tilled with sweeps, 19·0 ; one-way disced, 18·3 ; basin-listed, 17·9. Method of tillage had little influence on wheat production during the first 12 yr of the experiment. In 1953, '54 and '56, higher wheat yields were obtained on the ploughed areas than on plots where other methods of primary tillage were used. A preliminary study indicated that there was a greater tendency for plant nutrients to accumulate in the 0- to 3-in. layer of sub-tilled plots than in the 0- to 3-in. layer of ploughed land. Average oat yields (bu/ac) obtained the year after wheat land was tilled in July by the various methods were : ploughed, 32·7 ; one-way disced, 29·8 ; sub-tilled with sweeps, 29·6 ; basin-listed, 28·4. During 3 seasons of above-average summer rainfall and early autumn rainfall, there was no appreciable difference in soil moisture at sowing time on the different tillage areas. The average yields of sweet-clover were very similar on the variously tilled areas. F. s.—A,M.H.

1032 Fernandes, S. J. G. and Sampaio, Gabriela, G. M. A influência da rotação sobre as qualidades nutritivas da proteína do trigo. [**Influence of crop rotation on the nutritive value of wheat protein.**] *Melhoramento* 1959, **12**, 5–12, bibl. 13, English summary. [Lab. Quím.-Agríc. Rebelo da Silva, Lisbon, Portugal] [Received April 1961]

Determinations were made of lysine content in grain samples of the wheat cultivar Preto Amarelo grown in different rotations. In rotation A (legume/wheat or fallow/wheat) the highest percentage of lysine in the protein was obtained after ploughing-in broad beans when in flower. In rotation B (barley/broad beans/wheat) the highest percentage of lysine in the protein was obtained by ploughing-in the stubble together with 2–4 tons of straw/ha. The percentage of protein in the grain was higher in rotation B than in A but the average percentages of lysine in the total dry matter and in the protein were only slightly higher in B than in A.—E.B.O.

1033 Army, T. J. and Hanson, W. D. **Moisture and temperature influences on spring wheat production in the Plains area of Montana.** *Prod. Res. Rep. No. 35 Montana agric. Exp. Sta., 1960* 1–25, bibl. 17.

The relation between the yield of spring wheat grown either continuously, or alternated with fallow in a dry-farming area, and certain climatic factors was studied from 34-yr-old records. Grain yield was found to be correlated significantly with soil moisture at sowing-time ($r = +0{\cdot}440$ under continuous and $+0{\cdot}407$ under alternate cropping); rainfall from sowing to tillering ($r = +0{\cdot}711$ and $+0{\cdot}563$) ; rainfall from tillering to heading ($r = +0{\cdot}548$ and $+0{\cdot}495$) ; maximum temperature between tillering and heading ($r = -0{\cdot}403$ and $-0{\cdot}534$) and maximum temperature between heading and the soft dough stage ($r = -0{\cdot}576$ and $-0{\cdot}577$).—R.H.F.

1034 Hanley, F. and others. **The effects of time of ploughing and time of drilling on the development and yield of the winter wheat crop following a clover ley.** *J. agric. Sci.* 1961, **56**, No. 1, 119–25, bibl. 2. [Sch. Agric., Univ. Cambridge]

In 2 experiments on a gault clay soil, winter wheat was grown after a pure stand of broad red clover. The clover was cut for hay in June and the aftermath cut and cleared in late Aug. Plots were ploughed in late Aug. to early Sept., late Sept., or mid-Oct. ; they were drilled in mid-Oct. or mid-Nov., and received either no N or a dressing of nitro-chalk applied to the seedbed, or in late Feb. to early March, or in early May. Late

ploughing decreased the number of wheat plants which had emerged and the number of shoots in spring. In the 1st experiment, late ploughing decreased grain yield, but increased the N content of grain and straw. Straw yield and 1000-grain weight were not affected. In the 2nd experiment time of ploughing did not affect yield of grain or straw, but late ploughing increased total number of spikelets per ear and the 1000-grain weight, and reduced the N content of the grain and the degree of lodging. Time of drilling had no effect on straw- or grain-yield, or the 1000-grain weight. Number of shoots and, in the 2nd experiment, total number of spikelets, number of grain-bearing spikelets and amount of lodging were greater when the wheat was drilled early. In the 1st experiment the N content of both grain and straw was greater when the wheat was drilled late. The effects of N were small and inconsistent.—A.M.H.

1035 Mihaĭlov, V. **[Autumn sowing of spring wheat in Jakut.]** [Russian] *Sel'hoz. Sibiri* (*Agric. Siberia*) 1960, **5**, No. 12, 40.

1036 Zlygostev, M. Ja. **[Autumn sowing as a method of rejuvenating seed of spring wheat.]** [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1960, No. 4 (124), 616–19. [Falensk State Select. Sta., Kirov Province]

1037 Olson, H. M. and Kapusta, G. **Wheat and barley. Yield reduction due to late planting at Williston 1957-1959.** *N. Dak. Fm Res.* 1960, **21**, No. 5, 12–15.

In a trial over 3 seasons (drier than average), wheat and barley were sown early (20 April) and late (16 May) under 5 fertility levels. The delay in sowing, irrespective of fertility level, caused a 20–25% reduction in grain yield of both crops.—R.H.F.

1038 Kudaĭbergenova, A. S. **[The effect of sowing method on certain characteristics of wheat.]** [Russian] *Izv. Akad. Nauk Kazah. SSR* (*Bull. Acad. Sci. Kazah SSR*) 1961, No. 1 (10), 101–12, bibl. 6.

From a 2-year study of physiological processes and yields of wheat (Džezkazgan variety) in the Karagandin region, it is concluded that sowing in wide rows (45 cm between rows) is the most satisfactory for the dry conditions of the Džezkazgan desert.—M.H.

1039 Nelson, C. E. **Effects of plant populations and nitrogen fertilizer rates on three varieties of irrigated spring wheat.** *Bull. 611 Washington agric. Exp. Sta.* 1960, pp. 11, bibl. 21, illus.

The best yields were obtained with 27 plants per sq. ft, equivalent to seed rates of 108 lb/ac for Marfed, 136 for Pilcraw, and 103 for Lemhi 53. A device for measuring the force required to break straw at the second internode gave a reliable index of resistance to lodging.—J.D.J.

1040 Ferguson, W. S. **Moisture consumption by wheat.** *Rep. Ann. Conf. Manitoba Agronomists* 1959, 48–51. [Received Feb., 1960]

In 1954–9, in a 2-year wheat/fallow cropping system an average of only 34·9% of the rainfall was used in crop production, and an average of 9·9 in. per year was lost during the crop-free period of the rotation. Even when the frequency of summer fallow was reduced to 1 year in 5, only 65% of the total rainfall was used for crop production and there was a loss of 4·9 in. of rainfall per year. Data are given illustrating the effect of place in the crop rotation and of fertilizer application on moisture consumption by wheat. Fertilized wheat on fallow used slightly less moisture than unfertilized wheat, while fertilized 3rd-crop wheat used considerably more water than 3rd-crop wheat without fertilizer. No evidence was found to support the hypothesis that summer fallow is necessary to provide reserve soil moisture for wheat production. The relationship between evapotranspiration, latent evaporation and rainfall is discussed. Data collected at Brandon suggested that when the moisture supply was less than 85% of field capacity, changes in latent evaporation had no appreciable effect on evapotranspiration. However, when soil moisture supplies were above this level, particularly if the soil surface was moist, the effect of the latent evaporative force in the atmosphere had an important bearing on moisture loss. Values for evapotranspiration of wheat as determined by direct measurement and estimated by soil-moisture budgets are compared.—A.M.H.

1041 Hodgson, H. C. **Wheat maturation trials.** *Rep. Dep. Agric. Kenya 1959* 1961, 39–40.

Grain samples of Regent wheat, sown at 2 dates a month apart, were taken weekly from 3 weeks before to 3 weeks after full ripeness. Determinations of dough strength supported the view that fine, dry weather prior to ripeness was required for a steady increase in dough strength to a maximum of 60 [units not stated] at full ripeness, but that this factor rapidly declined during the 3rd week after ripeness, the cause not being directly attributable to weather. Harvesting should not therefore be delayed. The crude-protein content of the grain, after initial fluctuation, became stable at maturity at 13·2% for the earlier sowing and 14·2% for the later. There was no consistent relationship between dough strength and crude-protein content.—R.H.F.

1042 Mitkov, T. Coltivazione in Bulgaria di frumento italiano. **[Cultivation of Italian**

wheat in Bulgaria.] *Progresso agric.* 1961, **7**, No. 1, 83–8, illus.

The wheats grown in Bulgaria are mostly of the soft winter type. Of the wheat varieties introduced from Italy and grown on a limited area, San Pastore yields best and is the most resistant to cold.—E.B.O.

1043 Bjaanes, M. Forsøk med høstsæd i Hedmark og Oppland. **Trials with winter cereals in Hedmark and Oppland.** *Forskn. Fors. Landbr.* 1960, **11**, No. 5, 483–505, bibl. 6, English summary. [Statens Forsøksgard Møystad, Norway]

In varietal trials with wheat, Sigyn and Sigyn II were the most winterhardy ; the latter had shorter and stiffer straw and it significantly outyielded the former. Under more favourable conditions Sigyn II yielded 13% less grain than Virtus or Odin, but Virtus was not recommended on account of its weak straw. The new variety Trond, which ripens 5 days earlier than Odin, has given promising results. Of 9 winter-rye varieties tested, Kongsrug II and Petkus II alone were suitable for combine-harvesting. In 10 trials on fertile soil Kongsrug II yielded 4920 kg grain/ha and Odin winter wheat 3710 kg/ha. In a date-of-sowing trial with wheat and rye during 1955–9, sowings made on 3 Sept. yielded more grain than did sowings on 11 or 19 Sept. F. Eng. s. —R.B.

1044 Varis, E. Antti-syysvehnä. **Antti winter wheat.** *Tamm. Hankk. Kasvinj. Siemenjulk.* 1960, 190–3, English summary. [Hankkija Co-op. Soc., Finland]

This new variety was put on the market by the Tammisto Plant Breeding Station in 1955. It is superior to Varma in cropping and in some qualitative characters. Its winterhardiness equals that of Varma. Antti is inferior to Varma in that its straw is long and it lodges slightly more readily; it also tends to sprout in the ear, and it has soft kernels. F. Eng. s.—G.M.R.

1045 Huttunen, E. Kevätvehnä. **Spring wheat.** *Tamm. Hankk. Kasvinj. Siemenjulk.* 1960, 36–44, illus., English summary. [Hankkija Co-op. Soc., Finland]

During the last 30 years, spring wheat has become the main crop in Finnish cereal production, and occupies an area 15 times larger than that devoted to winter varieties. Earliness is an essential character under Finnish conditions. Svalöf Diamant is satisfactory for the southern parts of the country. Apu, which is about 1 week earlier than Diamant, is especially valuable in the north. Tammi is grown in central Finland, while in the south and south-west preference is given to Weibullsholm Svenno. F. Eng. s.—G.M.R.

1046 Baženova, N. M. **[New valuable varieties of soft spring wheat in the North-east (of the Soviet Union).]** [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1960, No. 4 (124), 514–16. [Sci. Res. Inst. Agric., N.E. Region of Non-Chernozem Zone]

1047 Pal, B. P. and others. **Performance of some recently evolved new Pusa wheats.** *Indian J. Genet.* 1959, **19**, No. 1, 36–55. [Indian Agric. Res. Inst., New Delhi]

Yield, maturity and rust resistance were studied in 3 new wheat varieties N.P. 797, N.P. 798 and N.P. 799. The trials were conducted throughout northern India. The new varieties were satisfactory for West Bengal, Delhi, Bombay, Bihar and Hyderabad. In all states where trials were conducted ear emergence was earlier in the new varieties than in the existing ones.—D.B.

1048 Department of Agriculture, Canada. **Cereal crops. Breeding and testing.** *Rep. Minist. Agric. Canad. 1958-9* 1959, 89–90. [Received Jan., 1960]

Two new red spring-wheat varieties are described. R.L. 2814 was equal to Selkirk in yield, slightly superior in resistance to leaf and stem rust, it matured 1–2 days earlier and excelled in strength of flour. R.L. 2936 was essentially equal to Thatcher in all agronomic, milling and baking qualities but was superior in resistance to stem rust. In tests over several years in Manitoba and E. Saskatchewan, Selkirk outyielded Thatcher by about 6 bu/ac in moist years, while in dry years their yields were about equal. The new barley var. York is briefly described. It is resistant to stem rust and mildew, and more resistant to lodging than is Brant.—A.M.H.

1049 Lebsock, K. L. and others. **Two new durums, Wells and Lakota.** *N. Dak. Fm Res.* 1960, **21**, No. 3, 4–6 ; and No. 4, 7–10. [N. Dak. Agric. Exp. Sta., Fargo]

The durum wheat varieties Wells and Lakota are described. Both ripen earlier, have shorter and stronger straw and are more resistant to stem rust than established varieties. They yield well and are acceptable for general milling and for macaroni processing.—A.M.H.

1050 Sacco, J. da C. Identificação das principais variedades de trigo do sul do Brasil. **[Identification of the principal wheat varieties of south Brazil.]** *Bol. téc. 26 Inst. agron. Sul* 1960, pp. 36, bibl. 11, illus.

Descriptions of these varieties and a key for their identification are given.—E.B.O.

1051 Pimentel, H. B.H. 546–nova variedade de trigo para o Estado do Paraná. **[B.H.**

546, a new wheat variety (*Triticum vulgare*) for Paraná State (Brazil).] *Bol. téc. 27 Inst. agron. Sul* 1960, pp. 29, bibl. 1, illus., English summary. [Esta. Exp. Curitiba, Brazil]

1052 Malato-Beliz, J. and others. Zur Systematik der Unkrautgesellschaften der west- und mitteleuropäischen Wintergetreide-Felder. [**Classification of the weed associations of the west- and central-European winter-wheat fields.**] *Mitt. Flor.-soziolog. Arbs-Gemeinsch. Stolzenau/Weser* 1960, n.s. No. 8, 145–7, bibl. 10, map. [Elvas, Portugal (J.M-B.) and Stolzenau/Weser (J.T. and R.T.)]

1053 Ilnicki, R. D. **The effects of 2,4-D, 4-(2,4-DB), 2-(2,4-DP) and silvex on wheat and spring oats.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 266–7.

Wheat was treated with 2,4-D, 4-(2,4-DB) and 2-(2,4-DP) at rates of 0·25–4 lb/ac and silvex [2-(2,4,5-TP)] at 0·25 – 2 lb/ac, at various growth stages from pre-emergence to early bloom. Oats were treated with 4-(2,4-DB), 2-(2,4-DP) and silvex at 0·5 – 4 lb/ac and 2,4-D at 1–4 lb/ac, at growth stages from pre-emergence to early head. Wheat was sensitive to all herbicides at rates of 2 lb/ac and over at any stage. The pre-emergence stage was the most sensitive ; applications of any of the herbicides at rates of 1 lb/ac and over caused significant yield reductions. Alpha-phenoxypropionic acids produced the greatest reductions. Rate for rate, 4-(2,4-DB) was the least toxic material. Reductions in oat yields were produced by 2,4-D and silvex at 1 lb/ac and over, and by the other herbicides at 4 lb/ac, at any growth stage. The most sensitive stage of growth was the early joint stage, followed by early head and pre-emergence stages. Silvex and 2,4-D caused severe yield reductions when applied at these stages, but 4-(2,4-DB) and 2-(2,4-DP) caused no serious injuries.—A.M.H.

1054 Burrage, R. H. and Tinline, R. D. **Common rootrot [*Cochliobolus sativus* =*Helminthosporium sativum*] and plant development following treatments of wheat seed with aldrin, gamma BHC, and heptachlor, with and without mercury fungicides.** *Canad. J. Pl. Sci.* 1960, **40**, No. 4, 672–9, bibl. 7. [Canada Dep. Agric. Res. Sta., Saskatoon, Saskatchewan]

1055 Grewal, J. S. and Vir, D. **Efficacy of different fungicides. 2. Field trials in relation to wheat rusts.** *Indian Phytopath.* 1959, **12**, No. 2, 168–71, bibl. 4. [Indian Agric. Res. Inst., New Delhi]

In field trials to control black rust (*Puccinia graminis tritici*) on wheat, 4 sprayings of parzate liquid (22% disodium ethylenebisdithiocarbamate) plus zinc sulphate, applied, respectively, at 0·5 gal and 0·75 lb/ac at fortnightly intervals beginning in the first week of Feb., reduced the rust infection from heavy to traces only, and increased yields correspondingly.—E.B.O.

1056 Pianka, M. **Mecarbam, a new multi-purpose organophosphorus insecticide.** *Chem. and Industr.* 1961, No. 10, 324. [Murphy Chem. Co., Wheathampstead, St. Albans, Herts]

The compound O,O-diethyl S-(N-ethoxycarbonyl-N-methylcarbamoylmethyl) phosphorothiolothionate (common name mecarbam) has proved to be a valuable insecticide. In field trials, technical mecarbam (which contains 90% mecarbam) gave good control of wheat aphid (*Toxoptera graminum*) and mites.—E.B.O.

1057 Department of Agriculture, Canada. **Field crops. Wheat.** *Rep. Minist. Agric. Canad. 1958-9* 1959, 26–8, 43, 92 and 96–7. [Received Jan., 1960]

In tests at Winnipeg, nickel chloride and nickel nitrate each applied at 1 lb/ac gave control of rust [*Puccinia graminis tritici*] and increased grain yields. In attempts to prevent infection of wheat with ergot [*Claviceps purpurea*], good results were obtained when maleic hydrazide was applied to nearby ergot-infected bromegrass to prevent heading and development of sclerotia. The growth of Thatcher wheat produced a factor which reduced emergence and growth of Kharkov wheat subsequently grown in the same soil. The growth-retarding factor was eliminated by steam sterilization of the soil. Investigations of the effect of temperature and light on leaf growth in Marquis spring wheat showed that leaves formed at low temperature and high light-intensity were small and thick, whereas those formed at high temperature and low light-intensity were small and thin. Short day produced greater leaf area than long day and the determining factor was the total amount of high-intensity light rather than the duration of illumination per day. Thickness and chlorophyll content were increased by extending short day with low light-intensity. Experiments at Lethbridge, Alberta, on the hardening of sprouting winter-wheat seeds in the dark showed that cold hardiness, as tested by exposure to −15°C for 16 hr, increased rapidly during the first 5 weeks of hardening at 1·5°C and decreased after the 6th week of growth in the hardening chamber. Hardening temperatures of 3·5 – 5°C reduced cold hardiness ; no survival was obtained after hardening at 5°C. Cold hardiness was related to physiological age, with the greatest hardiness at the 5–7 tiller stage. Root-rot infection predisposed winter wheat to cold injury, and *vice versa*. Glasshouse studies at Swift Current, Saskatchewan, showed that wheat yielded 113% more where moisture stress was

increased at the tillering stage than where moisture was adequate. A similar phenomenon occurred in the field.—A.M.H.

1058 Blaim, K. Wpływ kumaryny na pobieranie wody przez ziarna pszenicy oraz jej działanie na wzrost korzonków i koleoptile. **Effect of coumarin on uptake of water by wheat seeds and its influence on the growth of rootlets and coleoptiles.** *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 2, 401–13, bibl. 16, illus., English and Russian summaries.

The sensitivity of rootlets to coumarin is greater than that of coleoptiles. It was found that coumarin has a distinct influence on water intake by swelling seeds. It inhibits intake through the embryo, but does not affect intake by the endosperm. No influence on enzyme activity was observed. F. Eng. s.—G.M.R.

1059 Michniewicz, M. and Chromiński, A. Wpływ auksyn i gibereliny na odporność na suszę pszenicy w okresie kiełkowania i wschodów. **The influence of auxins and gibberellic acid on the resistance to drought of wheat during the period of germination and initial growth.** *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 2, 383–99, bibl. 18, Russian and English summaries.

Immersion of winter-wheat seed in solutions of auxins (potassium salt of l-naphthaleneacetic acid and 3-indolylacetic acid) and of GA before sowing considerably accelerated their sprouting in sand of low moisture content. The positive influence of auxins was observed only in sand of 12% moisture, while that of GA appeared in sand of 12, 20 and 50% moisture (the range tested) although its efficacy was greatest at the 12% level. The auxins were most effective at 0·001% concentration, and GA at 0·005% concentration. None of the preparations had any significant effect on the growth of the roots, and a positive effect on the growth of shoots was observed only where GA had been used. F. Eng. s.—G.M.R.

1060 Ward, G. M. **Potassium in plant metabolism. 3. Some carbohydrate changes in the wheat seedling associated with varying rates of potassium supply.** *Canad. J. Pl. Sci.* 1960, **40**, No. 4, 729–35, bibl. 14. [Canada Dep. Agric., Ottawa, Ontario]

Wheat seedlings grown in sand culture responded to decreased K application with increases in reducing-sugar content and in invertase activity. [See *Fld Crop Abstr.* 12 : 567.] F. s.—R.B.

1061 Esteban, V. E. Experiencias de vernalización de trigo. [**Vernalization trials with wheat.**] *An. Edafol. Agrobiol.* 1960, **19**, No. 3, 155–62, bibl. 3. [Esta. Exp. Zaidín, Granada, Spain]

Seeds of the wheat variety Valenciano were vernalized (2–5°C) for 15, 30 and 45 days and were then sown in plots on 20 Jan. and 20 Feb. ; non-vernalized controls were sown on 20 Nov. (normal sowing date), 20 Jan. and 20 Feb. With sowings in Nov. and Jan., there were no significant differences in grain yield between controls and plants from vernalized seeds. All sowings in Feb. gave yields considerably lower than from earlier sowings; this is attributed to low rainfall in May and June. —E.B.O.

1062 Avakjan, A. A. [**The passing of the vernalization phase in some varieties of winter wheat.**] [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1960, No. 4 (124), 490–5, illus. [Exp. Base, Inst. Genet., Acad. Sci. USSR]

1063 Topornina, N. A. [**Passing the vernalization phase in winter wheat under field conditions.**] [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1961, No. 1 (127), 83–6, bibl. 7, illus. [Inst. Genet., Acad. Sci. USSR]

1064 Hoshikawa, K. **Studies on the pollen germination and pollen tube growth in relation to the fertilization in wheat.** *Proc. Crop Sci. Soc. Japan* 1960, **28**, No. 4, 333–6, bibl. 12, Japanese summary. [Fac. Agric., Univ. Tokyo]

1065 Banasik, O. J. **Quick wheat protein test.** *N. Dak. Fm Res.* 1960, **21**, No. 8, 13–16, bibl. 4, illus. [N. Dakota Agric. Coll., Fargo]

The Udy protein analyzer (a portable proprietary instrument operating on a colorimetric basis) enables a determination of the protein content of grain to be made in about 5 min. In a comparison with the Kjeldahl method on 189 wheat samples, a correlation of +0·970 was obtained. It gave a highly reproducible and accurate estimate at all levels of protein tested.—R.H.F.

1066 Linko, P. and Sogn, L. **Relation of viability and storage deterioration to glutamic acid decarboxylase in wheat.** *Cereal Chem.* 1960, **37**, No. 4, 489–99, bibl. 42. [Kansas Agric. Exp. Sta., Manhattan]

From a survey of 25 samples of stored wheat, the glutamic acid decarboxylase activity (as measured by the amount of CO_2 evolved under standardized conditions) was significantly correlated with (a) the percentage of germ-damaged wheat ($r = +0{\cdot}878$) and (b) the germination percentage ($r = +0{\cdot}921$). No such correlation was found in 19 samples of freshly harvested wheat. F. s.—R.H.F.

OATS

See also Abs. 1053, 1457.

1067 Huttunen, E. Kaura. **Oats.** *Tamm. Hankk. Kasvinj. Siemenjulk.* 1960, 55–63 and

199–201, illus., English summary. [Hankkija Co-op. Soc., Finland]

For some decades oat-growing in Finland has remained stable in amount, and its area is comparatively independent of that of other crops. Sisu is common in the southern, Eho in the central, and Tammi in the northern areas of production. Svalöf Sol II and the Dutch Pendek are also grown. In efforts to achieve earlier ripening the variety Kyrö has been produced and was released in 1959. It ripens 6 days earlier than Sisu, and because of its stiff straw it is suited to swamp land. It is hoped to replace Tammi by Kyrö, and Sisu by the higher-yielding line Ta 693. F. Eng. s.—G.M.R.

1068 Statens Forsøgsvirksomhed i Plantekultur, Denmark. Forsøg met havresorter 1957–60. [**Varietal trials with oats 1957-60.**] *Medd. 652 Stat. Forsøgsvirk. Plantekult.* 1961, pp. 4.

In trials at 12 locations in Denmark on clay and sandy soils, the oat varieties Svaløf Stål F [Steel F], Vigor, Pendek and Silber II were compared during 1957–60, Svaløf Stål A [Steel A] and Svaløf Stål F during 1957–9, and Svaløf Stål F, Weishafer Vollbringer, Svaløf 01672, Civena and Pajbjerg Rex A during 1959–60. Svaløf Stål F was outyielded by Vigor, while Pendek yielded 0·5 and Silber II 2 hkg/ha less. Yields of Svaløf Stål A were similar to those of Svaløf Stål F. In the 2-yr trial, Weishafer Vollbringer yielded 2% more than Svaløf Stål F, Svaløf 01672 yielded the same, while Civena yielded 1% less and Pajbjerg Rex A 2% less. Straw yields of Civena and Svaløf 01672 were somewhat lower, and those of Pendek much lower, than those of the remaining varieties. Silber II, Pendek and Civena were the most susceptible to lodging. At 2 other locations on calcareous marine sedimentary soil, Weishafer Vollbringer and Pajbjerg Regent 97 outyielded Svaløf Stål F, while on 2 types of peat soil Pajbjerg Regent 97 and Abed Palu gave the highest yields.—R.B.

1069 Seed World. **Tonka, new spring oat variety.** *Seed World* 1960, **86**, No. 2, 14.

The spring-oat variety Tonka, recommended for Oklahoma, gave a higher yield and test weight than other varieties available in the State. Its straw strength is equal to Neosho and Cherokee and it is resistant to Victoria blight [*Helminthosporium victoriae*].—A.M.H.

1070 Stucker, R. and Frey, K. J. **The root-system distribution patterns for five oat varieties.** *Proc. Iowa Acad. Sci.* 1960, **67**, 98–102, bibl. 6. [Iowa Agric. and Home Economics Exp. Sta., Ames]

Dry weights of the root systems of 5 oat varieties were determined at 4-in. intervals to a maximum depth of 24 in. The varieties produced a differential distribution of root dry weight at the various depths sampled. Over 60% of the root dry weights of the Corn Belt varieties, Clinton, Marion, and Andrew, was in the upper 4-in. of soil, whereas comparable values for Craigs-afterlea and A465 were 50% and 35%, respectively. The root dry weight to a depth of 24 in. was the same at the boot stage as at maturity. F. s.—R.H.F.

1071 Poluhina, I. N. and Masljanaja, M. K. [**The influence of nitrogen and copper on the anatomical structure of the oat stem in relation to its lodging in peat soils.**] [Russian] *Izv. Timirjazevsk. S.-H. Akad.* (*Bull. Timirjazev agric. Acad.*) 1961, No. 1 (38), 205–8, bibl. 7, English summary.

1072 Stallcup, O. T. and others. **Composition of the oat plant as affected by level of nitrogen fertilization and stage of maturity** [Abstract]. *J. Dairy Sci.* 1960, **43**, No. 6, 867. [Univ. Arkansas, Fayetteville]

1073 Page, E. R. **Location of manganese taken up in short-term absorption by oat roots.** *Nature, Lond.* 1961, **189**, No. 4764, 597, bibl. 3, illus. [West Scot. Agric. Coll., Auchincruive, Ayr]

In experiments with the oat variety Sun II, the data show that : (a) short-term uptake of Mn occurs more rapidly in the meristematic region of the oat root ; (b) translocation of Mn occurs within the root ; when the tips are separated from the remainder of the root their uptake is lower, and that of the rest of the root higher, than when uptake occurs in the complete excised root. —M.H.

1074 Frey, K. J. **Effect of gibberellic acid on oats.** *Proc. Iowa Acad. Sci.* 1960, **67**, 92–7, bibl. 7. [Iowa Agric. and Home Economics Exp. Sta., Ames]

Putnam oat plants were sprayed with GA in concentrations of 10, 100, 1000 and 2500 ppm. at 24 hr before and 24 and 144 hr after anthesis. The application 24 hr before or after anthesis caused 10–50% elongation of the upper internodes. Weight of the primary kernels was depressed approximately 10% and that of the secondary ones 15%. The effect upon seed size was independent of time of application or of concentration. F. s.—R.H.F.

RYE

See also Abs. 1043.

1075† Barnes, B. S. **Station releases new rye strain named Explorer.** *Miss. Fm Res.* 1960, **23**, No. 4, 1 and 8. [Mississippi Agric. Exp. Sta.]

The principal characteristics of the variety are high grain and forage yields and resistance to leaf rust [*Puccinia dispersa*].—R.H.F.

1076 Strun, M. and others. **[Transformation of winter rye (*Secale cereale*) into spring rye as a result of changing the conditions of vernalization.]** [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1961, No. 1 (127), 78–82, bibl. 10.

BARLEY

See also Abs. 1037, 1048, 1487.

1077 Widdowson, F. V. and others. **Applying nitrogen fertilizers for spring barley.** *J. agric. Sci.* 1961, **56,** No. 1, 39–47, bibl. 2. [Rothamsted Exp. Sta., Harpenden, Herts]

In 15 experiments on spring barley (mainly Proctor), in 1957–9, alternative methods of applying 0·3, 0·6 and 0·9 cwt N/ac were compared. Combine-drilling 0·3 or 0·6 cwt N as ammonium sulphate/ac produced higher mean yields than broadcasting, but drilling 0·9 cwt N/ac checked early growth and reduced mean yields in 2 of the 3 seasons. When a dressing of 0·3 cwt N/ac combine-drilled was supplemented by an equivalent top-dressing of nitro-chalk, yield was consistently greater than when a single drilled or broadcast dressing supplied the same total quantity of N. Supplementing a drilled dressing of 0·6 cwt N/ac with an equivalent top-dressing was less advantageous. Gains from N fertilizers were recorded at every centre. Dressings in excess of 0·6 cwt N/ac gave only small gains in yield and caused severe lodging in 1958 [a wet year]. The N content of barley receiving no N fertilizer averaged 1·7%. A seed-bed dressing of 0·3 cwt N/ac had little effect on N content ; heavier dressings gave appreciable gains in N content. All dressings of N increased the proportion of small grains in the sample. F. s.—A.M.H.

1078 Kivi, E. I. Ohra. **Barley.** *Tamm. Hankk. Kasvinj. Siemenjulk.* 1960, 44–54 and 194–8, illus., English summary. [Hankkija Co-op. Soc., Finland]

The results of 6-row and 2-row barley varietal trials are tabulated. Of the 6-row varieties, Paavo, placed on the market early in 1960, had the highest yield and stiffest straw. A hybrid of Tammi and Edda, for fodder, yielded 10% more than Tammi and ripened only 1 day later. It is now available under the name of Otra and is intended to replace Tammi. Its kernel is larger than Tammi's and its straw is as stiff. Of the 2-row varieties, Svalöf Bonus gave the best yield. Pallas, a derivative of Bonus, is under trial, as are the malt barleys Carlsberg II and Balder. Other varieties reported on are the Norwegian Domen, Weibullsholm Ingrid and Svalöf 50/102. Susceptibility to sprouting in the ear, with the growing use of combines and the frequency of wet autumns, is a character of importance in deciding the value of new varieties. F. Eng. s.—G.M.R.

1079 Hamilton, D. G. and others. **Reaction of barley varieties and selections to root rot and seedling blight incited by *Helminthosporium sativum* P.K. and B.** *Canad. J. Pl. Sci.* 1960, **40,** No. 4, 713–20, bibl. 11, illus. [Canada Dep. Agric., Ottawa, Ontario]

A technique for evaluating the resistance of barley varieties to attack by the above fungus is described. Of 600 varieties and selections tested, 51 were resistant. Anoidium, Br. 3962-4, Lenta and Opal B were the most resistant varieties. F. s. —R.B.

1080 Hagborg, W. A. F. and others. **Plant diseases committee report.** *Rep. Ann. Conf. Manitoba Agronomists* 1959, 14–19. [Received Feb., 1960]

Zineb and a mixture of zineb and nickel chloride [rates not given] were the most effective chemicals tested against the complex of fungal leaf diseases of barley, although they did not kill mildew [*Erysiphe graminis*]. In field-plot tests there was a significant reduction in direct transmission of stripe mosaic virus in a susceptible barley variety following a single application of 100% whey at 40 gal/ac, or 3 applications of 20% whey, or 4 of skim milk. Dithane Z-78, various nickel salts and mixtures of nickel chloride or nickel sulphate with dithane Z-78 gave good control of leaf rust [*Puccinia triticina*] of wheat when applied 4 times during the season. Nickel salts used at 1 lb/ac gave better rust control than dithane Z-78 at 2 lb/ac, but mixtures of 1 lb nickel salt and 1–1·5 lb dithane Z-78 gave better control than either component used separately. Four applications of nickel salt increased the yield of Thatcher wheat by up to 15 bu/ac and 4 applications of a mixture of a nickel salt and dithane Z-78 gave increases of up to 21 bu/ac. The use of sprays of these materials also caused substantial increases in the 1000-kernel weight and bu-weight of Thatcher wheat.—A.M.H.

1081 McFadden, A. D. and others. **Association between seed size and the incidence of loose smut in barley.** *Canad. J. Pl. Sci.* 1960, **40,** No. 4, 611–15, bibl. 4. [Exp. Fm, Lacombe, Alberta]

Loose smut (*Ustilago nuda*) infection on barley seed was shown to be greater in the case of small and medium-sized seeds than in large seeds. It is suggested that seed stocks to be used in breeding and testing procedures should each have the same proportions of small seeds removed to guard against misleading results. F. s.—R.B.

1082 Middleton, L. J. and others. **Relative uptake and translocation of potassium and cesium in barley.** *Pl. Physiol.* 1960, **35**, No. 6, 913–18, bibl. 12. [Univ. California, Berkeley]

1083 Thorne, G. N. **Effects of age and environment on net assimilation rate of barley.** *Ann. Bot., Lond.* 1961, **25**, No. 97, 29–38, bibl. 9. [Rothamsted Exp. Sta., Harpenden, Herts]

To distinguish between the effects of age and environment on net assimilation rate (E) of barley (var. Brant) grown in the open in pots at Ottawa, E was measured outdoors (treatment N) and on similar plants transferred to a constant environment for the 2 weeks during which E was determined (treatment T). During June and July, E of treatment N decreased by 77% ; for treatment T this fall increased to 90% of the initial value. E and average day and night temperatures were greater in the constant environment than outdoors in early June, and in July they were greater outdoors. Incident light energy was always greater outdoors. Thus, the fall in E with age was partially masked outdoors by an increase caused by the improvement in environmental conditions. Plants grown continuously in the constant environment had lower E, greater leaf area and dry weight, and ears emerged earlier than plants of similar age that had been transferred for 2 weeks to the constant environment from outdoors. E of plants grown continuously in the constant environment decreased with time. After ears emerged, E for treatments N and T was measured on plants whose ears were shaded to prevent them photosynthesizing. Photosynthesis in the ear accounted for 19% of the final ear dry weight during the first 2 weeks after emergence, 12% during the 3rd and 4th, and 3% during the 5th and 6th weeks. Shading had no effect on weight of plant parts other than ears, and had similar effects outdoors and in the constant environment. F. s.—m.h.

1084 Kaufmann, M. L. and McFadden, A. D. **The competitive interaction between barley plants grown from large and small seeds.** *Canad. J. Pl. Sci.* 1960, **40**, No. 4, 623–9, bibl. 8, illus. [Canada Dep. Agric. Exp. Fm, Lacombe, Alberta]

The effect of competition between barley plants grown from large and small seeds on their yield was demonstrated in both glasshouse and field tests. Plants from small seeds yielded approximately 77% as much grain as those grown from large seeds in the glasshouse and 57% as much in the field with inter-plant competition ; with inter-row competition the percentages were 70 and 54, respectively, and, with no competition, 89 and 83, respectively. It was further shown that increased competition favoured plants from large seeds. Superior production resulted mainly from a greater number of heads on plants grown from large seeds. F. s.—r.b.

1085 Januškevič, S. I. [**Resistance of barley and wheat grain to gamma-rays in relation to conditions of growth before irradiation.**] [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1961, No. 1 (127), 95–102, bibl. 7, illus. [Moscow State Univ.]

Varieties of these crops from different geographical sources do not show the same resistance to the effects of gamma rays. This is attributed to differences in the plants' physiological and biochemical constitution which arise from differences in growth conditions.—m.h.

MAIZE

See also Abs. 1185, 1223, 1506.

1086 Bateman, H. P. **Effects of basic tillage methods and soil compaction on corn production.** *Bull. 645 Ill. agric. Exp. Sta.* 1959, pp. 35, bibl. 19, illus.

Three basic tillage treatments in preparation for maize, viz. turning residues under, mixing them throughout the tilled layer, and leaving a mulch on the surface, were studied in 1953–6. The row-spacings used were 40 in., or alternately 40 and 90 in. with a strip of lucerne in the 90-in. space ; the crop received 75 or 150 lb N/ac. These tillage treatments required fewer operations and less labour than is generally used to grow a maize crop in Illinois. The performance of various machines in seed-bed preparation and cultivation is compared. When the maize was sown the various amounts of tillage produced little difference in soil moisture at seed level, and soil moisture changed little during the germination period. Soil resistance to penetration by a metal probe was least in the seed-bed prepared by the plough and greatest in that prepared by the rotary tiller. Loss of plant population due to cultivation or barren stalks was not affected by variation in tillage treatments. Tillage treatments also had little influence on the amount of maize lost in machine harvesting, but less was lost in the rows spaced 40 and 90 in. apart than in those spaced 40 in. apart, and less maize was lost in standing maize than in lodged maize. Maize yields produced by using minimum tillage treatments were equal to or greater than those produced by more intensive tillage. Ploughing normally produced higher yields than did other methods. The plots with alternate 40- and 90-in. row-spacings yielded less than those with 40-in. spacings, but the decrease in yield was not in proportion to the one-third reduction in the area sown to maize. Yields were higher where the

maize rows were in the same position each year than where the positions of maize and lucerne alternated in successive years. The rate of N used had little effect on yield increase or on harvest loss. F. s.—A.M.H.

1087 Toniolo, L. Prova di epoche di semina in un confronto fra ibridi e varietà locali di mais. [**A sowing-date trial comparing maize hybrids with local varieties.**] *Agricoltura d. Venezie* 1961, **15,** No. 1, 11–21, bibl. 13. [Ist. Agron. Univ. Padova, Italy]

In a plot trial lasting 3 years the maize varieties Marano (early) and Bianco Perla (medium-late) and the hybrids Insubria 521 SDF (medium-late) and 420 W Asgrow (late) were sown at 3 dates each year (23 Apr., 10 and 24 May in 1957, 4 and 29 Apr. and 22 May in 1958, 4 and 27 Apr. and 20 May in 1959). Plant density was 6 plants per m^2 for Marano and 4·6 plants per m^2 for the other types. The general conclusion was that Marano, Bianco Perla and Insubria 521 SDF yielded significantly more when sown in late April. The hybrid 420 W Asgrow yielded well from both the 1st and 2nd sowing dates but in 1959 it yielded significantly more from the 1st than from the later sowing dates. The hybrids yielded more than the varieties.—E.B.O.

1088 Grogan, C. O. and others. **Date-of-planting studies with corn.** *Res. Bull. 706 Missouri agric. Exp. Sta.* 1959, pp. 68.

Eight maize hybrids in pairs representing maturity periods of 90, 115, 125 and 140 days were tested at 2 contrasting centres in 3 seasons (1955–7). The highest yields in all cases were obtained from 140-day varieties sown on the earliest possible date in April. Only when sowing was delayed until June did the performance of the more rapidly maturing varieties approach that of the full-season varieties. The early-sown crops had the best agricultural characteristics and suffered least from insect attack.—J.D.J.

1089 Mynbaev, T. [**Changes in maize growth depending on cultivation measures.**] [Kazah language] *Vestn. Akad. Nauk Kazah. SSR* (*J. Acad. Sci., Kazah SSR*) 1961, **17,** No. 1, 65–9, Russian summary.

The data are concerned with maize growth and development as affected by seed-bed preparation, sowing depth, number of plants per pocket, and the amount of moisture available to the crop in the early vegetative period. F. Russ. s. —M.H.

1090 Dorywalski, J. and Fertala, K. Wpływ niecktórych sposobów siewu kukurydzy na plon ziarna. [**Influence of certain methods of sowing maize on yield of seed.**] *Roczn. Nauk rol.* 1960, **80,** Ser. A, No. 3, 495–512, bibl. 6, illus., English summary. [Poznan Coll. Agric., Poland]

Experiments from 1954 to 1957 compared the sowing of maize along the southern wall of the furrow, along ridges, and on a flat surface, and also sowing at the end of April and in the middle of May, respectively. Thermographs installed in the furrows and on the flat surface showed that during the day it was warmer in the furrows but at night cooler than in the flat areas. Temperatures at or below F.P. were noted more frequently, lasted longer and were somewhat lower in the furrows than on the flat area. Nevertheless, the maize seedlings developed more in height and dry-matter increment in the furrows, and the plants finally reached a greater height and the yields of grain were greater than in the other positions. The earlier date of sowing resulted in a distinctly higher yield of grain. These results were confirmed by those of an analogous experiment conducted at Zielecin during 1954–5. F. Eng. s.—G.M.R.

1091 Dorywalski, J. Wpływ glebokości siewu kukurydzy na wschody i plon ziarna. [**Influence of the depth of sowing maize on seedling development and yield.**] *Roczn. Nauk rol.* 1960, **80,** Ser. A, No. 3, 513–23, bibl. 4, English summary. [Poznan Coll. Agric., Poland]

In field experiments in 1955–57, the influence was studied of 6 different depths of sowing on maize seed in light, permeable sandy-clay soil of pH 5·5 with moderately good water relations. As the depth of covering was increased, initial growth and root development were stunted, the rate of seedling development was retarded, and there was a distinct drop in grain yield. This was especially noticeable when a depth of 9 cm was exceeded. Sowing depths of 10·5 and 12 cm resulted in numerous vacancies in the plots. No relationship was detected between damage caused by birds and depth of sowing. F. Eng. s.—G.M.R.

1092 Portjanko, V. F. **The nature and biological role of the coleoptile in *Zea mays*.** [Russian] *Bot. Z., SSSR* (*Bot. J. USSR*) 1961, **46,** No. 3, 419–21, bibl. 8. [Melitopol' State Pedagogic Inst.]

The subject is considered in connexion with depth of sowing.—M.H.

1093 Foth, H. D. and others. **Corn root development.** *Quart. Bull. Mich. agric. Exp. Sta.* 1960, **43,** No. 1, 2–13, illus.

The spatial distribution and development of the roots of the maize variety Michigan 250 (an early-maturing hybrid) growing under high-fertility conditions, at a row-spacing of 42 in. and a plant density of 18,500/ac, in a loam soil well supplied with water, was studied by sampling on 10 occasions between the 11th and 98th day of

growth. One shallow cultivation was given 2 weeks after emergence. Extensive lateral root development occurred during the first 27 days by which time 89% of the roots were in the top 6 in. of the soil and 17% at a distance of 3–21 in. from the plant. Less than 10% of the roots were below 12 in. by the 35th day. The nature of root spread appeared to be that a given volume of soil had to be "filled" with roots before further spread occurred, leader roots having already penetrated more distant regions. Soil-moisture determinations, after a period of drought, showed an increase from 12·2 to 14·0% between 0 and 21 in. from the plant, thus suggesting a relation between "filling" capacity and soil moisture. The curves for lateral and vertical root development throughout the growing period followed a similar pattern. The curve for total root growth was sigmoidal in shape, 75% growth occurring during the middle third of the period. On the 98th day, only 2% of the roots were below 24 in. The total weight of roots was estimated to be equivalent to 1186 lb/ac, of which one-third was attributable to brace roots which developed between the 41st and 49th days.—R.H.F.

1094 Sommerfeldt, T. G. **Effect of irrigation, plant population and row spacing on corn yield.** *N. Dak. Fm Res.* 1960, **21,** No. 5, 16–19.

In a maize trial conducted in 1959, the variables used were : plant populations of 14,000, 18,000 and 22,000/ac ; row spacings of 24, 32 and 40 in. ; no irrigation, irrigation until 2 weeks after tasselling and continuous irrigation. Grain yields increased from 84·7 to 128·9 bu/ac with increasing plant population and increasing soil moisture. Row spacing had little effect on yield when moisture was abundant and plant population was low. The highest yields were obtained from a close row spacing of 24 in., and high density of 22,000 plants/ac under irrigation.—R.H.F.

1095 Vázquez, R. **Effects of irrigation, nitrogen levels, and plant population on corn yields in Lajas Valley, P.R.** *J. Agric. Univ. P.R.* 1960, **44,** No. 3, 121–37, bibl. 5, illus. [Lajas Substation]

The treatments used for 3 experimental crops of maize were : irrigation at 30 and 60% moisture depletion from the root zone, and no irrigation ; topdressing with ammonium sulphate at 0, 80 and 160 lb N/ac ; populations of 9600, 14,500 and 19,400 plants/ac. The results showed that : (1) irrigation had no influence on yield when 20 in. of well distributed rain fell during the crop season; (2) there was no significant difference between the 2 levels of irrigation used ; (3) there was a highly significant increase in yield with increasing plant population in irrigated plots of 2 of the 3 crops ; (4) highly significant interactions were obtained between irrigation and plant population and between plant population and N fertilizing.—R.H.F.

1096 Hinkle, D. A. and Garrett, J. D. **Corn fertilizer and spacing experiments.** *Bull. 635 Arkansas agric. Exp. Sta.* 1961, pp. 34, bibl. 15, illus. [Main Exp. Sta., Fayetteville, Arkansas]

The main conclusions from experiments conducted from 1949–57 were as follows : the optimum plant population, when nutrient supply was adequate, lay between 12,000 and 16,000/ac ; highest yield was obtained when 150–180 lb N/ac were applied ; P and K were of limited or even negligible value.—R.H.F.

1097 Young, R. A. and others. **Corn maturity not delayed by nitrogen fertilizer.** *N. Dak. Fm Res.* 1960, **21,** No. 5, 22–3.

In 7 trials the percentage moisture content at maturity of maize from plots receiving 0, 30 and 60 lb N/ac was 35·0, 33·2 and 33·6, respectively, and in 2 further trials, in which the top-dressing rates were increased to 0, 40 and 80 lb N/ac, the percentage moisture in the grain was 34·5, 32·6 and 32·3, respectively.—R.H.F.

1098 Fol'mer, N. [**The effect of organo/mineral fertilizers on yield of maize in the forest/steppe of the Trans-Urals.**] [Russian] *Sel'hoz. Sibiri (Agric. Siberia)* 1960, **5,** No. 12, 20–4. [Troick Exp. Sta., Celjabinsk Province]

1099 Moschler, W. W. and others. **Corn.** *Res. Rep. Va agric. Exp. Sta. 1957-9* 1960, 83–6. [Received March, 1960]

A method of maize growing which requires less soil preparation than usual is briefly described. The maize is sown in a separate operation immediately after ploughing, without seedbed preparation, and it germinates in the seedbed made by the rear wheels of the tractor. Pre-emergence herbicides applied at sowing, and one cultivation when the maize was knee high, usually gave good weed control. The method is thought to be promising for light, sandy soils. Simazin, atrazine and fenac were promising for weed control in maize. Aldrin and heptachlor granules, broadcast before sowing at 1·8–2·0 lb toxicant/ac and disced into the top 2–3 in. of soil, gave excellent control of maize-root webworm (*Crambus calliginosellus*).—A.M.H.

1100† Ebert, D. Ein Beitrag zur Frage der Ausreife bei Silomais. [**Ripening of silage maize.**] *Albr.-Thaer-Arch.* 1961, **5,** No. 1, 65–71, bibl. 6, map, Russian and English summaries. [Inst. Acker- u. PflBau, Martin-Luther-Univ., Halle-Wittenberg, E. Germany]

There was a relatively constant relationship between the duration of the vegetative phase and

the length of the growing period of silage maize. Four clearly defined maize-ripening zones were distinguished in E. Germany. Zone I, for early-ripening maize, lies in an area around Berlin and in a strip parallel with the Elbe from Niederlausitz to Altmark. This zone is suitable for seed multiplication of silage maize. Zone II, a more extensive area surrounding the 2 areas of Zone I, is climatically suited to the cultivation of silage maize. Zone III is a small transitional zone in the southwest of E. Germany and is suitable for normal and early-ripening varieties. Zone IV occupies 2 climatically different areas, one in the extreme north influenced by the Baltic sea, the other a mountainous area in the extreme south ; both areas are suitable for cultivation of early-ripening types.—D.B.

1101 Department of Agriculture, Canada. **Forage crops. Pre-harvest top killing of corn.** *Rep. Minist. Agric. Canad. 1958-9* 1959, 100. [Received Jan., 1960]

After maize kernels were fully dented, indicating 50% moisture content, neither killing the top with a chemical desiccant, nor cutting and stooking, speeded up the drying of the grains appreciably compared with maize left standing. Both treatments gave similar yield reductions, averaging 13%.—A.M.H.

1102† Longo, G. Su alcuni mais e sorghi di possibile coltivazione in Sicilia. [**Some varieties of maize and sorghum which can be grown in Sicily.**] *Tecnica agric.* 1960, **12**, No. 4, 421–6. [Ist. Agron. Gen. Univ. Catania, Sicily]

Yield trials were carried out in 1958–9 with the fodder-maize hybrid Mielmais 50 (H.S. 50), 2 local maize varieties and the sorghum varieties Satiro, Martin's Milo and Norkan. The maize was sprinkler-irrigated every 15 days and the sorghum every 20 days. Mielmais yielded best (48,748 kg fodder/ha, from one cut), followed by Norkan (34,482 kg from 2 cuts) and Satiro (26,230 kg from 3 cuts). Martin's Milo and the local maize varieties yielded considerably less (18,779 – 19,207 kg).—E.B.O.

1103 Thomas, W. J. **Two new field corn hybrids available to farmers in 1961.** *Sci. Fmr* 1960, **8**, No. 1, 10. [Pennsylvania State Univ., Pa]

A brief description is given of the field qualities of hybrids Pa 290 and Pa 475.—R.H.F.

1104 Meggitt, W. F. **The influence of cultivation on corn yields when weeds are controlled by herbicides.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 241–6, bibl. 2. [Rutgers Univ., New Brunswick, New Jersey]

The effect of cultivations used in conjunction with herbicides was evaluated on 2 soil types and under conditions where maize followed row crops (tomatoes) or a sod crop (lucerne). It was concluded that one, and in some cases two, cultivations were needed to produce maximum maize yields on most soil types, except those of light texture or in excellent tilth as a result of the previous cropping. There was no difference whether the one cultivation was made early in the growth of the plant or at lay-by, provided weeds were adequately controlled early in the season. Simazin, atrazine and 2,4-D gave good weed control throughout the growing season, even without cultivation. A 12-in. weed-free band over the row plus one cultivation was not sufficient to eliminate weed competition. F. s.—A.M.H.

1105 Vengris, J. **Quackgrass control in field corn.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 370–3. [Massachusetts Agric. Exp. Sta., Amherst]

Tests in 1958–9 indicated that eptam [EPTC] is effective in controlling quackgrass (*Agropyron repens*). Spring application of 5–6 lb eptam/ac mixed 4–5 in. deep with the seedbed soil is suggested. Simazin and atrazine at about 6 lb/ac are also recommended. These herbicides gave better quackgrass control than did 8 lb dalapon/ac. F. s.—A.M.H.

1106 Springer, F. B. **The effectiveness of simazine and atrazine as pre-emergence herbicides on corn in Delaware in 1959.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 237–40. [Delaware Agric. Exp. Sta., Newark]

Atrazine at 2 and 4 lb/ac gave excellent control of broad-leaved weeds and grasses. Simazin at these rates gave good control of broad-leaved weeds but not of grasses. Atrazine was more effective than simazin when moisture was limited. F. s.—A.M.H.

1107† Bell, R. S. and Larssen, E. **Pre-emergent weed control in silage corn, 1958-59.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 364–6. [Rhode Island Agric. Exp. Sta., Kingston]

Granular and spray preparations of atrazine gave excellent weed control. Simazin spray was more effective than a granular preparation. Simazin retarded the growth of northern nutgrass [*Cyperus esculentus*]. Maize treated with granular atrazine yielded significantly more than hand-hoed controls. F. s.—A.M.H.

1108 Vengris, J. **Weed control in field corn.** *Proc. N.E. Weed Control Conf.* [*USA*] 1960, **14**, 367–9, bibl. 1. [Massachusetts Agric. Exp. Sta., Amherst]

Ten different herbicides at various rates and times of application were used on maize with a

weed population of *Digitaria sanguinalis*, *Echinochloa crus-galli*, *Amaranthus retroflexus* and *Chenopodium*. All the chemicals and rates used controlled broad-leaved weeds, and all except a post-emergence application of 0·5 lb 2,4-D/ac also controlled weed grasses. The best weed control was obtained with 4 or 6 lb eptam [EPTC]/ac mixed with the soil before sowing, or 4 lb randox [α-chloro-N,N-diallylacetamide]/ac applied pre-emergence plus 0·5 lb 2,4-D amine/ac applied when the maize was 8 in. tall. Eptam and fenac stunted maize but did not reduce yields. F. s.—A.M.H.

1109 Grancini, P. Ulteriori risultati sul diserbo chimico del mais. [**Further results from chemical weeding of maize.**] *Maydica* 1961, **6**, No. 1, 4–22, bibl. 15, illus., English and German summaries.

In N. Italy in 1960 many maize fields were sprayed, for weed control, with solutions of gesaprim and gesatop which contains 50% atrazine and simazin, respectively. Results confirmed those obtained in the previous year [see *Fld Crop Abstr.* 13 : 1120]. The rate of application generally recommended is 4 kg of gesaprim or of a mixture of gesaprim plus gesatop/ha. Both atrazine and simazin give effective control of weeds in maize, but atrazine has a quicker action. Simazin, on the other hand, is more effective than atrazine against *Digitaria* and *Setaria*. *Chenopodium album*, *Amaranthus* and *Panicum* are easily controlled by both preparations. Treatment is generally given before emergence but gesaprim is effective also after emergence, especially against *Amaranthus* and *C. album*. The efficacy of these herbicides is influenced by the moisture content of the top layer of the soil, e.g. 2 kg gesaprim/ha may be sufficient on soil of a high moisture content while 4 kg/ha may be ineffective on dry soil.—E.B.O.

1110 Gigger, R. P. and Flanagan, J. H. **A report on atrazine post-emergence in corn-weed control and corn plant residue analyses.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 231–6. [Geigy Agric. Chemicals]

Plots were sprayed with a logarithmic sprayer, at a starting rate of 4 lb atrazine in 35 gal water/ac. Applications were made (a) pre-emergence, (b) at weed emergence, (c) when weed growth was 1–1·5 in. tall, (d) 2–3 in. tall, (e) 3–4 in. tall. Plots were conventionally sprayed at rates of 2, 2·25, 2·5 and 3 lb atrazine/ac in 35 gal water, when weed growth was 1–2 and 3–5 in. tall. Broad-leaved weeds were completely controlled by atrazine at 2 lb/ac when applied up to the weed-emergence stage. Later applications required 2·25 lb/ac to give complete control. Foxtail grasses (*Setaria viridis*, *S. lutescens*) and barnyard grass (*Echinochloa crus-galli*) needed slightly higher rates. No injury to the maize was noted at rates up to 8 lb/ac. Faster weed kill occurred when rain followed the post-emergence applications than when no rain fell. The atrazine content of the maize up to 50 days after spraying is tabulated. —A.M.H.

1111 Meggitt, W. F. **Progress report on herbicides for weed control in corn and soybeans.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 259–65. [New Jersey Agric. Exp. Sta., Rutgers Univ., New Brunswick]

Eight herbicides were tested for weed control in maize and 10 for pre-emergence weed control in soyabeans. Atrazine at 2 or 4 lb/ac provided excellent weed control throughout the season, without injury to or reduction in yield of maize. Simazin gave satisfactory weed control when applied pre-emergence, either as 50 or 80% wettable powder or 4 or 8·5% granular formulations, but the latter gave poorer control. In 1959, 2,4-D ester and granular formulation both reduced maize yields and gave only moderate control of grasses. EPTC incorporated in the soil gave excellent weed control but reduced maize yield. In soyabeans, dinoseb (spray or granular), amoben and DAC-893 gave good control of broad-leaved and grass weeds with no reduction in stand or yield. CIPC, Dow M1329 (=zytron) and EPTC gave good control of annual grasses but fair to poor control of broad-leaved weeds. Analogues of EPTC gave poor weed control where they were not incorporated in the soil. F. s.—A.M.H.

1112† Halisky, P. M. and Smeltzer, D. G. **Disease of corn, sorghum, and sudangrass. Head smut established in California.** *Calif. Agric.* 1961, **15**, No. 1, 10–12, illus.

A description is given of the symptoms of attack and the distribution of outbreaks of the soil-borne fungus *Sphacelotheca reiliana* on maize, grain sorghum and *Sorghum sudanense*. Methods of control are suggested.—R.H.F.

1113 Lespès, L. Lutte contre *Sesamia nonagrioides* Lef. [**Control of *S. nonagrioides*.**] *Cah. Rech. agron. 10 Minist. Agric. Morocco* 1960, 99–109.

Trials were carried out in 1956–8 to study the control of *S. nonagrioides* on maize by treatment with various preparations. The maize was sown during 1–10 April, and the treatments were applied during 20 May to end of June. Endrin was considerably more effective (92%) than rotenone, aldrin and dieldrin (62, 67 and 78% effectiveness, respectively). Three applications of each were sufficient. The greatest increase in yield (68%) was obtained by treatment with dieldrin at a concentration of 25 g a.i./hectolitre.—E.B.O.

1114 Whitcomb, W. H. and Wall, H. C. **Southwestern corn borer infestations as influenced by dates of planting.** *Ark. Fm Res.* 1959, **8**, No. 6, 3.

Preliminary results indicated that much damage to maize by the southwestern corn borer [*Zeadiatraea grandiosella*] can be avoided by sowing early. For northern Arkansas, sowing before 1 May is recommended.—A.M.H.

1115 Wall, H. C. and Whitcomb, W. H. **Insecticidal tests for control of southwestern corn borer.** *Ark. Fm Res.* 1960, **9**, No. 4, 5.

In a series of insecticide trials carried out in 1957-9 at various sites in Arkansas, good control of the southwestern corn borer (*Zeadiatraea grandiosella*) was given by endrin at 0·4 lb a.i./ac and thiodan at 0·5 lb a.i./ac, whilst sevin at 1.0 lb a.i./ac and SD 4402 at 0·5 lb a.i./ac were considered promising materials. It is recommended that applications be made before the borers have entered the stalks and when 50% of the stand shows signs of damage from fresh feeding.—R.H.F.

1116 Shu Ting Chang. **The effect of freezing temperatures of varying intensities and duration on the germination of maize harvested at different stages of maturity.** *Diss. Abstr.* 1960, **21**, No. 3, 406. [Univ. Wisconsin, Madison]

1117 Dure, L. S. **Site of origin and extent of activity of amylases in maize germination.** *Pl. Physiol.* 1960, **35**, No. 6, 925–34, bibl. 32. [Univ. Texas, Austin]

The enzymes α and β amylase were studied during the germination of maize, with respect to their amylotic activity, secretion by the scutellum and development in the endosperm. F. s.—R.H.F.

1118 Fritschen, L. J. **Transpiration and evapotranspiration of corn [maize] as related to meteorological factors.** *Diss. Abstr.* 1960, **21**, No. 3, 391. [Iowa State Univ., Ames]

1119 Mynbaev, T. T. **[Peculiarities of the root system of maize in argillaceous soils of Central Kazahstan.]** [Russian] *Izv. Akad. Nauk Kazah. SSR* (*Bull. Acad. Sci. Kazah SSR*) 1961, No. 1 (10), 45–51, bibl. 13.

1120 Murdy, W. H. **The strengthening system in the stem of maize.** *Ann. Mo. bot. Gdn* 1960, **47**, No. 3, 205–26, bibl. 25, illus.

The system providing strength to a maize stem is described as consisting of thick-walled, lignified cells located in 3 distinct stem tissues : hypodermis ; peripheral bundle sheaths ; and sclerified ground parenchyma. Striking changes occur in the disposition of these tissues from the base of a stem to the apex, and these are directly related to the plant's mode of development. Inter-racial differences in amount and arrangement of sclerotic tissue are described and are contrasted with the strengthening systems of *Euchlaena* and *Tripsacum*. F. s.—R.H.F.

1121 Handley, R. and others. **Metabolic and non-metabolic uptake of sodium in roots of *Zea mays*.** *Pl. Physiol.* 1960, **35**, No. 6, 907–12, bibl. 20. [Univ. California, Berkeley]

It was concluded from experimental evidence that the uptake of sodium, (as ^{22}Na), by the roots of maize grown in nutrient solutions, was entirely non-metabolic in the region of the root tips (0 – 1·8 mm) and that metabolic absorption coincided with the development of vacuoled, differentiated tissue further from the root tip.—R.H.F.

1122 Mosolov, I. V. and Volleidt, L. P. **[The effect of the ratio of nutrient elements on phosphorus metabolism, growth and yields of maize.]** [Russian] *Izv. Akad. Nauk, SSSR* (*Bull. Acad. Sci., USSR*) *Ser. Biol.* 1961, No. 2, 262–70, bibl. 17, illus. English summary. [All Union Sci. Res. Inst. Ferts and Agropedol.]

1123 Petinov, N. S. and Pavlov, A. N. **[Increasing the protein content of maize].** [Russian] *Vestn. Akad. Nauk SSSR* (*J. Acad. Sci. USSR*) 1960, **30**, No. 10, 61–3.

The use of foliar applications of urea to increase the protein content of maize grain and green matter is reported.—M.H.

1124 Nickerson, N. H. and Embler, T. N. **Studies involving sustained treatment of maize with gibberellic acid. 1. Further notes on responses of races.** *Ann. Mo. bot. Gdn* 1960, **47**, No. 3, 227–42, bibl. 28, illus.

The 2 northern flint maize varieties, New York and Parker's, together with 2 southern dent varieties, Gourdseed and Cherokee, and a South American type, Argentine Pop, were the subjects of this study. Results and experimental details were similar to those reported in *Fld Crop Abstr.* 13 : 623.—R.H.F.

1125 Hanower, P. and others. Działanie HCH na kukurydze. **[The effect of BHC on maize.]** *Roczn. Nauk rol.* 1960, **80**, Ser. A, No. 4, 741–52, bibl. 18, English and Russian summaries. [Sta. Agric. Chem., Warsaw]

In a 1-yr experiment with maize the doses [quantities not stated] of BHC applied at first stimulated and then delayed development processes. The stimulation was seen in an increased percentage of dry matter and N-free extracts, and a fall in percentage protein. At the milk-yellow-ripe stage of the maize a considerable lowering of the percentage dry-matter content occurred under the influence of BHC. A negative effect was exercised on the yield measured in dry matter and food units per ha, and this was most marked

under a double application of BHC. The pervading smell of BHC appeared to repel birds. F. Eng. s.—G.M.R.

1126 Gžesjuk, S. and Mežvinskaja, T. **[Physiological and biochemical peculiarities of grain-ripening in maize.]** [Russian] *Agrobiologija (Agrobiology, Moscow)* 1961, No. 1 (127), 37–49, bibl. 29, illus.

1127 Grzesiuk, S. and Rejowski, A. Studia nad fizjologią ziarna kukurydzy zwykłej [*Zea mays* ssp. *indurata*). **[Study of the grain physiology of *Z. mays* var. *indurata*.]** *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 1, 137–75, bibl. 46, illus., English and Russian summaries.

Grain was taken from the lower part of maize ears every 4 days between pollination and harvest. Fresh grain and air-dried grain were studied after 6 months storage. Three phases of grain development were distinguished : (1) from zygote to early stages in development of the radicle and plumule, lasting for 28–32 days (grain taken in this period did not germinate) ; (2) development of scutellum, primary root with coleorhiza, vascular tissue and new leaves, lasting about 30 days (germination of most seed taken in this period was satisfactory) ; (3) final development of the seed. This last phase corresponded with the stage of wax-maturity, when loss of grain moisture and increase in germinating vigour were rapid. The post-harvest rest period was not well marked. Intensity of respiration fell into 3 phases : (1) great intensity, lasting from pollination to inception of milk maturity ; (2) medium intensity, lasting from milk- to wax-maturity ; (3) low intensity, lasting from wax- to full-maturity. Observations on maize grown from grain of different maturity stored (a) threshed and (b) in cobs showed that the slowest growth rate resulted from the youngest grain and the fastest from grain harvested in the period of wax- and full-ripeness. The largest grain yields were obtained from plants grown from grain harvested in the first half of the wax-ripe phase. The storing of grain in cobs also had a positive influence on yield. Vernalization of grain [stored threshed or on the cob] at temperatures of 1 – 3°C and 15 – 18°C for 25 and 50 days neither shortened the period of vegetation nor caused any marked increase in grain yield. The vernalization of fully matured grain at high (30°C) and variable (30–20°C) temperatures gave negative results. F. Eng. s.—G.M.R.

1128 Bressani, R. and Conde, R. **Changes in the chemical composition and in the distribution of nitrogen of maize at different stages of development.** *Cereal Chem.* 1961, **38**, No. 1, 76–84, bibl. 21. [Inst. Nat. Central Amer. and Panama, Guatemala]

On a moisture-free basis, the content of N, crude fibre, and ash decreased, while ether extract and carbohydrate content increased as the maize grain matured. The concentration of 8 amino acids was followed from the 10th to 65th day after flowering. F. s.—R.H.F.

1129 Hallauer, A. R. **Effects of some selected weather factors on the development and drying of corn grain.** *Diss. Abstr.* 1960, **21**, No. 3, 391–2. [Iowa State Univ., Ames]

1130† Lassiter, C. A. and others. **Storage of high moisture corn in upright silos and its feeding value for dairy cows.** *Quart. Bull. Mich. agric. Exp. Sta.* 1960, **43**, No. 1, 58–66, illus.

Maize grain with a moisture content of 25–35% was stored satisfactorily in upright concrete silos for up to 3 months after which its feeding value, on a dry-matter basis, was not inferior to that of similar maize dried to 14% moisture before storage.—R.H.F.

1131 Nicholson, E. G. **Chicha [native drink] maize types and chicha manufacture in Peru.** *Econ. Bot.* 1960, **14**, No. 4, 290–9, bibl. 21.

SWEET-CORN

1132 Huelsen, W. A. and Brown, W. N. **Artificial drying of sweet corn seed.** *Bull. 656 Illinois agric. Exp. Sta.* 1960, pp. 48, bibl. 15.

This study describes the development of an open-pit dryer over which the ears are placed in trays. The pit should not exceed 80 ft in length, and it should have a uniform cross-section of 8 × 8 ft, with a level floor.—J.D.J.

SORGHUMS AND OTHER MILLETS

See also Abs. 1102.

1133 Grimes, D. W. and Musick, J. T. **How plant spacing, fertility, and irrigation affect grain sorghum production in southwestern Kansas.** *Bull. 414 Kansas Univ. agric. Exp. Sta.*, 1959, 3–17, illus.

It was concluded, from field experiments carried out from 1952–8, that under conditions of adequate soil moisture the optimum space per plant is 50–60 sq. in. and that rows should not be > 14 in. apart ; when soil moisture is limited, however, rows may be up to 28 in. apart. The amount of irrigation water used and the response to NP and K fertilizers was unaffected by plant spacings varying between 28 and 112 sq. in.—R.H.F.

1134 Meredith, R. M. **Fertilizer recommendation for masakwa [*Sorghum durra*] in the Yola area.** *News Lett. Minist. Agric. N. Reg. Nigeria* 1960, No. 25, 6–7.

Observations indicate that fertilizers should be applied at the time of transplanting and placed 3 in. each side of the seedling.—R.H.F.

1135 Wikner, I. and Atkins, R. E. **Drying and maturity of grain sorghum as affected by water loss from plant parts.** *Iowa State J. Sci.* 1960, **35,** No. 1, 25–40, bibl. 13, illus. [Iowa State Univ. Sci. Techn.]

Loss of moisture in the field from the grain, pedicels, rachis, peduncle, leaves and stem of 6 varieties of sorghum was studied throughout a period of 10 harvestings at 5-day intervals. A similar pattern of moisture loss was obtained for all varieties. For the first 7 harvests grain moisture fell from an initial 47·5 – 52·5% to 12 – 13% in linear fashion. Moisture loss from pedicel, rachis, peduncle and leaf was accelerated by frost. No consistent relationship was established between rate of grain-moisture loss and either loss from the other plant parts or degree of compactness of the heads. The maximum dry weight of grain was attained when grain was harvested at a moisture content of 31–39%. F. s.—R.H.F.

1136 Zoerb, G. C. **Effects of combine adjustments on sorghum crackage.** *S. Dak. Fm Home Res.* 1959, **10,** No. 4, 20–4.

In field tests on sorghum at 11% moisture content, cylinder speed was the chief factor affecting seed damage. At cylinder speeds of about 3500 ft/min the average visible seed damage was 5% or less. At speeds usually recommended for sorghum (4000-5000 ft/min) visible damage was 10–25%. Including very small, non-visible cracks (revealed by a dye technique), total damage was 40–70%. Cylinder-concave clearance did not seem to affect seed damage at settings of 5/32 – 13/32 in. at the rear of the concave. Cracking decreased as feed rate increased. F. s.—A.M.H.

1137 Department of Agriculture, Tanganyika. [**Control of *Striga* in stands of sorghum.**] *Rep. Dep. Agric. Tanganyika 1959* 1960, 20.

In an experiment at Ukiriguru on the control of *Striga*, crop rotations which included sorghum or in which cotton was grown for 5 years in succession failed to reduce the *Striga* population. But when sorghum was grown each year, and the *Striga* was hand-pulled every 14 days, the *Striga* population was reduced and sorghum yields improved. Pulling every 28 days was less effective.—J.D.J.

1138 Last, F. T. **Direct and residual effects of *Striga* control treatments on sorghum yields.** *Trop. Agric., Trin.* 1961, **38,** No. 1, 49–56, bibl. 23. [Gezira Res. Sta., Wad Medani, Sudan]

The application of 2,4-D to sorghum for control of *Striga hermonthica* in 1957 had no residual effect in 1958. Trap-cropping with Sudan grass (*Sorghum sudanense*) for 5 weeks in 1958 significantly decreased the incidence of *S. hermonthica* and increased grain yields of sorghum by 500 lb/ac. Compared with unmanured controls, 400 lb ammonium sulphate (21% N) and 200 lb superphosphate (21% P_2O_5)/ac applied during 1957 increased yields of sorghum grain and straw in 1958 from 2150 and 4750 to 3210 and 6060 lb/ac, respectively, and decreased *S. hermonthica* infestation from 6·1% to approximately 1·3% after 36 days' growth and from 49·9 to 16·2% after 75 days' growth.—s.m.j.

1139 Lange, W. H. and others. **New California pest. Sorghum midge found in San Joaquin Valley.** *Calif. Agric.* 1961, **15,** No. 1, 7–9, illus.

A description is given of the life history and damage caused to grain sorghum by the sorghum midge (*Contarinia sorghicola*) discovered in Tulare county, California, in Oct. 1960. Cultural methods of control are suggested.—R.H.F.

1140 Gardner, F. P. and Kasperbauer, M. J. **Seedling emergence and growth responses of dwarf grain sorghum as affected by gibberellic acid.** *Iowa State J. Sci.* 1961, **35,** No. 3, 311–18, bibl. 7.

The effects of GA as a seed treatment and as a foliar spray on dwarf grain sorghum were studied under glasshouse and field conditions. Concentrations of 10 or 100 ppm. of GA hastened emergence and increased initial height of the plants, but both of these effects were short-lived. The effect of GA as a seed treatment increased with sowing depth, resulting in a significant GA × depth interaction. However, after a few days, emergence of the untreated equalled the emergence from treated seeds, and the interaction no longer remained. Responses to GA under field conditions and under glasshouse conditions were similar ; both supplied conditions that were nearly optimum for growth. GA applied as a seed treatment had no effect on the mature height, lodging, maturity or seed yield measured under field conditions. GA applied as a foliar spray had no effect on growth of the plants or on mature height, lodging, maturity or seed yield. The narrow range of responsiveness during the growth cycle of the dwarf plant was discussed. F. s.—R.H.F.

1141† Mankin, C. J. **Seed treatment controls head smut of proso millet.** *S. Dak. Fm Home Res.* 1959, **10,** No. 4, 18–19, illus.

The results are given of tests of 10 fungicides used as seed dressings to control smut [*Sphacelotheca destruens* ?] of proso millet [*Panicum miliaceum*]. Organic mercury compounds, e.g. ceresan, gallotex and meta-sol gave the best results.—A.M.H.

1142 Grodzinskiĭ, A. M. **Competitive interrelations between millet [*Setaria glauca*] and weeds.** *Ukr. bot. Ž., Kiev.* (*Ukr. Bot. J.*) 1960, **17,** No. 6, 54–7, bibl. 4, English and Russian summaries.

1143 Scholz, H. Der Formenkreis der *Setaria italica* (L.) P.B. Ein Beitrag zur Kulturpflanzenkunde. [**The group *S. italica*.**] *Ber. dtsch. bot. Ges.* 1960, **73,** No. 10, 471–6, bibl. 17, illus. [Inst. systematische Botanik u. Pflanzengeographie der Freien Univ., W. Berlin, Germany]

This is a contribution to the taxonomy of *Setaria italica*.—D.B.

RICE

1144 Langfield, E. C. B. and Moir, J. D. **Rice growing in Australia's Northern Territory.** *Span* 1961, **4,** No. 2, 67–70, illus. [Coastal Plains Res. Sta., Humpty Doo, Darwin]

1145 Valente, E. G. O arroz em Moçambique. 2. Cultura, melhoramento, caracteres diferenciais. [**Rice in Mozambique. 2. Cultivation, improvement, differential characters (of cultivars).**] *Melhoramento* 1959, **12,** 51–162, bibl. 12, French summary. [Esta. Exp. Umbeluzi, Mozambique] [Received April 1961]

1146 Komoda, K. **Improvement of farming practice with special reference to flexible rice culture method [in Japan].** *Internat. Rice Comm. News Lett.* 1960, **9,** No. 3, 20–7. [Oita Agric. Exp. Sta., Japan]

In Japan, rice is grown mainly in the irrigated lowlands. In many areas south of lat. 38°N both rice and wheat are grown in the same year. Rice is transplanted in June and harvested in late Oct. to early Nov. while wheat is sown in Nov. and harvested in June. A number of short-season northern rice varieties were tested in the south and some of them matured within the same period as in the north, without flowering abnormally early. It has, therefore, become possible to grow 2 consecutive rice crops in one year, with a short interval for mechanized cultivation, but the progress of this practice of growing an early-season and a late-season rice crop in succession is comparatively slow compared with progress in the growing of an early-season rice crop only. This early crop is harvested before the end of Aug. and thus escapes exposure to devastating typhoons at the time of heading (during Sept.). The recommended early-season variety is Norin No. 17.—E.B.O.

1147 Hirano, T. **Studies on the rice cultural practices by late transplanting in cool region.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1960, **28,** No. 4, 353–4, bibl. 13, English summary. [Tohoku Agric. Exp. Sta.]

This summary of earlier papers analyses the causes of reductions in rice yield which follow late transplanting in cold regions (a necessary practice when growing a second crop). There are 2 methods of cultivation for late transplanting : (1) dense sowing of early and normally maturing varieties ; (2) sparse sowing of approximately 180 ml seed (approx. 360 seeds) per 3·3 m². Plants reared by the first method before transplanting suffer because the tiller nodes are higher and tiller emergence and heading are delayed ; only varieties with a strong resistance to blight and an ability to accumulate carbohydrates and proteins can give satisfactory yields by this first method. On the contrary, plants growing in a thin stand grow vigorously ; tiller nodes are lower, heading is earlier and yields are higher. The likelihood of a good yield decreases as the sowing rate increases from 180 to 360 ml seed/3·3 m². Diagrams show the manner of development of rice plants after late transplanting following dense and sparse sowing. F. Eng. transl.—D.B.

1148 Dore, J. **The relation of flowering and maturation period in some Malayan rices to sowing date and latitude.** *Malay. agric. J.* 1960, **43,** No. 1, 28–48, bibl. 6. [Botany Div., Dep. Agric., Malaya]

A summary is given of results from field trials with Malayan rice varieties carried out during the past few years with the object of determining the relationship of sowing date and latitude to time of harvest in various regions of Malaya. Although in that country the variations in hours of light from day to day and between one month and the next are small, rice varieties show a response to day-length. Sowings in Dec.–March give very long times to ear emergence, whilst sowings in Aug.–Oct. give the minimum time to ear emergence.—E.B.O.

1149 Orsi, E. W. de L. Effetti della profondità di trapianto e dell'età delle piantine di riso sull'entità della produzione. [**Effect on yield of depth of transplanting and age of rice plants.**] *Riso* 1960, **9,** No. 11, 7–13, bibl. 6, illus. [Sta. Sper. Risicolt., Vercelli, Italy]

A plot trial was carried out to determine the best age of rice plants and the best depth for transplanting them with regard to rice yields and other characteristics including plant height, tillering,

number of spikelets per ear, weight and length of ear, and weight of 1000-spikelets. Rice plants of the variety Roverbella, 56 or 46 days old, were transplanted at a depth of 3, 6 or 10 cm. Results showed that the best depth for transplanting was 3 cm. The usual depth for transplanting rice in Italy is 3–4 cm. When transplanted during 1–20 June, 56-day-old plants were better than those 46 days old.—E.B.O.

1150 Ministry of Agriculture and Lands, Jamaica. **[Rice investigations 1956-7.]** *Bull. 57 (N.S.) Rep. Minist. Agric. Lands, Jamaica* Kingston, 1960, 31–5 and 49–50.

Five varieties from the USA were tested at 3 centres. Seed was drilled direct at 80 lb/ac, and the plots were irrigated from the 3rd day onwards. Taking previous trials into account, it is concluded that Sunbonnet and Bluebonnet 50 give the best yields when average yields from all varieties are high, and Zenith when they are low. Direct sowing in drills 11 in. apart at a seed rate of 80 lb/ac was compared with transplanting seedlings when 45 days old at 6 × 6 in. spacing and 3 seedlings per hole. Sowing and transplanting were done on the same day. The transplanted rice gave substantially higher yields, the same result being obtained with Bluebonnet 50 and Sunbonnet varieties.—J.D.J.

1151 Department of Agriculture, Tanganyika. **[Rice cultivation.]** *Rep. Dep. Agric. Tanganyika 1959* 1960, 20.

In a trial in Morogoro district, spacings of 6 × 6, 12 × 12 and 18 × 18 in. yielded 6160, 5120 and 4680 lb of undried paddy/ac. Soils appear to have improved with working, but puddling has not increased yields.—J.D.J.

1152 Department of Agriculture, Seychelles. **Rice.** *Rep. Dep. Agric., Seychelles 1959* [n.d.], 16.

Trials of swamp rice were continued, using the salt-water-resistant variety Radin Siak II. The crop was sown in a nursery and later transplanted. The yield was satisfactory (*c.* 2215 lb paddy/ac). The main objection to growing rice is the difficulty of controlling the Cardinal weaver bird (*Foudia madagascariensis*).—E.B.O.

1153 Aglibut, A. P. and others. **Irrigation and drainage in lowland rice production.** *Philipp. Agriculturist* 1960, **44**, No. 6, 271–8, bibl. 13.

1154 Piacco, R. Temperatura dell'acqua in risaia in rapporto alla sua altezza. **[Temperature of water in the rice field in relation to its depth.]** *Ann. Sta. sper. Risicolt., Vercelli 1956* 1960, **4**, 39–45, illus., English and French summaries.

In the Italian rice-fields the depth of the irrigation water is generally kept at 10–12 cm. In the trial described, 3 compartments of a rice field were kept under 5, 10 and 20 cm of water, and water temperatures were taken daily during the first month of cultivation (26 April–25th May). Mean temperatures were practically the same in the 3 compartments (19·23°, 19·25° and 19·22°C). The maximum and minimum temperatures showed small variations (less than 1°C) from one compartment to another. These results would justify irrigating rice fields to a greater depth for weed control.—E.B.O.

1155 Hall, V. L. and Tackett, D. L. **A greenhouse study of water management of rice.** *Ark. Fm Res.* 1960, **9**, No. 3, 3, illus. [Rice Branch Sta., Stuttgart, Ark.]

The variety Bluebonnet 50 was subjected to the following 4 treatments: (1) continuously flooded; (2) never flooded; (3) flooded, drained, re-flooded; (4) delayed flooding. Results are tabulated for nitrogen content of plant tops and roots and for seed yield, grain nitrogen and days to heading. Highest yield was obtained when flooding was delayed (59 days from sowing and thence to harvest), and indications were that ear-emergence was hastened by flooding.—R.H.F.

1156 Hall, V. L. **Greenhouse studies on the effect of single applications of nitrogen at different stages of rice growth.** *Rep. Ser. 92 Arkansas agric. Exp. Sta.* 1960, pp. 21, bibl. 9.

In pot experiments, early varieties (Zenith and Nato) yielded most grain and grain with the highest N content when N was applied 8·5 and 14·5 weeks after sowing, respectively. Corresponding times for the mid-season variety (Bluebonnet 50) were 12 weeks and 18 weeks. The time taken from tiller initiation to stem elongation was found to be a function of variety, and was not shortened by application of N. The time when N was applied had no influence on the period from sowing to ear emergence, but raising the N rate from 60 to 150 lb/ac delayed ear emergence by 2 days.—J.D.J.

1157 Beagher, R. L. and Wells, J. P. **Rice fertilizer studies, 1952 to 1958.** *Bull. 620 Arkansas agric. Exp. Sta.* 1960, pp. 37, bibl. 9.

On a near-neutral soil low in nutrients, 80–100 lb N/ac increased the yields of Zenith and Nato without incurring serious lodging, and 135–160 lb could safely be applied to Bluebonnet 50 and Toro. All sources of N tended to be equally effective. The best results were obtained when the first 80 lb N were applied to Bluebonnet 50 and Toro before the first flooding in continuously flooded fields, or before the second flooding in fields drained and reflooded 40 – 60 days after sowing. Any additional amounts were best kept

back and applied at the early boot stage, 80 – 85 days after sowing. Anhydrous liquid ammonia could be injected immediately before sowing, or in Feb., with good results, but was less effective when injected in the previous Nov. A system of adding N to irrigation water was also devised. Responses to P and K were irregular. Iron aluminium sulphate significantly increased yields on an alkaline soil, and limestone on an acid one.—J.D.J.

1158 Obuhova, V. M. [**The significance of algae in the regime of rice fields.**] [Russian] *Izv. Akad. Nauk Kazah SSR (Bull. Acad. Sci. Kazah SSR)* 1961, No. 1 (10), pp. 91–101, bibl. 43.

1159 Richharia, R. H. **Origins of cultivated rices.** *Indian J. Genet.* 1960, **20**, No. 1, 1–14, bibl. 24, illus. [Central Rice Res. Inst., Cuttack]

1160 Tinarelli, A. Classificazione e riconoscimento delle varietà italiane di riso. [**Classification and identification of Italian rice varieties.**] *Riso* 1961, **10**, No. 2, 8–12, illus.

This article is concerned with the commercial classification of rice varieties in Italy, based on their grain characteristics.—E.B.O.

1161 Mucci, F. Prove comparative di rendimento su stirpi di recente costituzione e cultivar di riso. [**Comparative yield trials with new strains and cultivars of rice.**] *Ann. Sta. sper. Risicolt., Vercelli 1956* 1960, **4**, 159–75, bibl. 23, English and French summaries.

Descriptions are given of the new Italian rice cultivars Balocco and Olcenengo.—E.B.O.

1162 Caffey, H. R. **Rice varieties tested for Mississippi Delta.** *Miss. Fm Res.* 1960, **23**, No. 4, 4, illus. [Stoneville, Mississippi]

Details of the performance in 1959 and characteristics of 14 commercial and experimental varieties are tabulated. The most suitable varieties for the Delta area are those currently in use, viz : Bluebonnet 50, Century Patna 231, Nato, Zenith and Gulfrose.—R.H.F.

1163 Poonai, P. **Some new varieties of rice.** *Rice Rev.* 1960, **2**, No. 4, 11–13.

The varieties BG 60/260, BG 60/36, BG 60/44 and BG 60/47 are briefly described. They were bred and are suitable for combine-harvesting in British Guiana.—R.H.F.

1164 Goarin, P. La lutte contre les mauvaises herbes dans la culture du riz à Madagascar. [**Weed control in rice crops in Madagascar.**] *Mém. Inst. sci. Madagascar* 1959, **9**, 35–40, bibl. 2. [Sta. Agron. Lac Alaotra] [Seen March, 1961]

In Madagascar the principal weeds of rice are : *Ischaemum rugosum* (the most noxious), *Leersia hexandra, Echinochloa colonum, E. stagnina, Panicum pyramidale, Pycreus tremulus, Courtoisia cyperoides* and *Eleocharis plantaginea.* In trials of chemical weed control, 2,4-D, applied by aircraft, controlled most weeds, with the exception of the Gramineae, and did not damage the rice plants. Against the Gramineae, cultural methods only are of any avail.—E.B.O.

1165 Mucci, F. Produzione e resistenza all'allettamento nel riso trattato con 2,4-D. [**Yield and resistance to lodging of rice treated with 2,4-D.**] *Ann. Sta. sper. Risicolt., Vercelli 1956* 1960, 107–24, bibl. 23, illus., English and French summaries.

In field trials over 2 years in N. Italy, rates of 2,4-D exceeding 200 g a.i./ha applied in more than one application, reduced rice yields, especially when a concentration of 0·1%, instead of 0·05%, was used. In all plots treated with 2,4–D, the average height of rice plants was reduced but their resistance to lodging was increased.—E.B.O.

1166 Smith, R. J. Jr. **Nitrogen management in rice infested with barnyardgrass.** *Ark. Fm Res.* 1960, **9**, No. 1, 2, illus.

The responses of Arkrose or Bluebonnet 50 rice to N when slightly and heavily infested with barnyard grass (*Echinochloa crus-galli*) were studied in 1957–9. Applications of N were as follows : none ; single applications of 60, 120 and 180 lb/ac at 8 weeks and 60 lb/ac at 12 weeks ; split applications of 60 lb/ac each at 3 and 8 weeks, 3 and 12 weeks, and 8 and 12 weeks after sowing. The competitiveness of barnyard grass with rice was increased when N was applied 3 weeks after sowing, when the grass was in the vegetative stage. Plots which received N at 3 weeks yielded 32 bu/ac, while those which received no N yielded 42 bu/ac. When N was applied 8 weeks after sowing, when barnyard grass was heading, yields from plots which received 60, 120 and 180 lb N/ac were 40, 61 and 75 bu/ac, respectively. High rates of N were less effective as split applications than as single ones. Rice that was free of weed grasses and received no N generally yielded as much as rice that was heavily infested with weed grasses and received 120–180 lb N/ac. Rice that was free of barnyard grass usually gave better yields with split than with single applications of N. Under grass-free conditions, single applications of 120 or 180 lb N/ac at 8 weeks increased the height and delayed the maturity of rice, making it more susceptible to lodging.—A.M.H.

1167 Giglioli, E. G. **Red rice investigations, 1951-1956.** *Rice Devel. Co. Ltd and Dep. Agric., Brit. Guiana* pp. 66. [Received Feb. 1961]

A history and layout of the Mahaicony-Abary scheme are given. The problem of red rice is discussed. The weed red rice, of which 18 types were recognized in a comprehensive survey, shatters readily in the field, matures up to 14 days before sown varieties and persists in the soil under adverse conditions. Red rice is particularly obnoxious where, as in this scheme, harvesting is mechanized. Five methods of control were investigated : (1) exhaustion of the soil reservoir of seed by encouraging germination in the off-season ; (2) grazing volunteer growth with cattle ; (3) use of herbicides ; (4) cultivation for the main crop under wet conditions ; (5) deep ploughing. Of these, the first 3 were found to be ineffective, impracticable or prohibitively expensive for large-scale implementation. Excellent control of red rice was achieved through wet cultivation (4), incidence being reduced by 31–74%, depending upon the degree of water control available. Drying-out of the land resulted in rapid germination of red rice. The technique was not, however, practicable for highly mechanized, large-scale production. Ploughing to a depth of 8 in. (5), with thorough inversion (mould-board plough) gave a significant, but variable, reduction of red rice and also a consistent and profitable increase in true rice yield.—R.H.F.

1168 Vámos, R. and others. **Relations of intensity of photosynthesis and appearance of *Piricularia oryzae* Cav. on the rice plant.** *Nature, Lond.* 1961, **189**, No. 4762, 407, bibl. 2. [Inst. Pl. Physiol., Univ. Szeged, and Szarvas Research Inst. Irrig. Rice Cult., Hungary]

Studies of the rice crop have indicated that the presence of fungi is a consequence of the effects of unfavourable soil and weather and is not directly related to browning. Tests were made of the effect of covering rice plants with black, white, red, and blue linen frames. There is evidence that the synthetic processes of the rice plant under the white cover were, to a certain extent, inhibited. In the leaves, as a result of disturbed physiological processes, free amino acids, mainly glutamin and asparagin, accumulated and rendered possible the appearance of the fungus. On the other hand, under the red cover, the undisturbed vital processes of the plants developing in the abundant red light prevented the fungus from becoming established. In these experiments, fungal infection could occur only after the elongation of the stem, that is, in the generative phase when the quantity of oxygen carried to the roots decreased significantly.—M.H.

1169 Caser, G. Disinfestazione del riso sotto vuoto con il bromuro di metile. [**Disinfestation of rice with methyl bromide under vacuum.**] *Riso* 1961, **10**, No. 4, 28–9, illus.

1170 Hart, M. G. R. and Roberts, E. H. **Possibility of fixation of atmospheric nitrogen by the rice plant.** *Nature, Lond.* 1961, **189**, No. 4764, 598-9, bibl. 1. [West African Rice Res. Sta., Rokupr, Sierra Leone]

Results of experiments with rice plants (var. Lead 35) grown from seed in trays refute the claims of Chakroboty and Sen Gupta (*Fld Crop Abstr.* 13 : 1711) ; no evidence of N-fixation was obtained by the authors who suggest that caution is necessary when applying the ordinary Kjeldahl methods to plants grown by hydroponics because of the unexpectedly high nitrate contents which may be found in such plants.—M.H.

1171 Alešin, E. P. **Respiration of rice roots with reference to ion adsorption.** [Russian] *Izv. Akad. Nauk SSSR (Bull. Acad. Sci. USSR) Ser. Biol.* 1961, No. 2, 256–61, bibl. 5, English summary. [Kuban Exptl Rice Sta., Krasnoda]

1172 Kawahara, H. and Chonan, N. **Observation on the differentiations of vascular bundles in vegetative and reproductive periods of rice plants.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1960, **28**, No. 4, 371–3, bibl. 6, illus., English summary. [Fac. Agric., Ibaraki Univ.]

1173 Ormrod, D. P. and others. **Responses of rice to photoperiod.** *Calif. Agric.* 1960, **14**, No. 5, 6–7, illus.

The relationship between days to heading and hours of daylight (9, 12, 15 and 18 from sowing time onwards) given for 5 American and 4 Japanese early, medium and late varieties, is discussed.—R.H.F.

1174 Sasamura, S. **Studies on the relation between the plant age and the degree of sensibility to short day length in the late paddy rice variety Zuihô.** *Proc. Crop Sci. Soc. Japan* 1960, **28**, No. 4, 355–8, bibl. 5, illus., Japanese summary. [Fac. Agric., Utsunomiya Univ.]

The age at which the rice plant becomes sensitive to short day was investigated in 4 types of experiment in each of which time of flower-bud formation and time of heading on the main stem were used as the criteria of sensibility. The results demonstrated that sensibility to short day begins before the development of the 5th leaf and that the degree of sensibility increases with age of the plant. Further, they showed that this increase was independent of nutrition and could not be attributed to the increase in leaf area.—D.B.

1175 Shah, S. S. **Response to photoperiod of four wild species of the genus *Oryza*.**

Indian J. Genet. 1959, **19**, No. 1, 98–106, bibl. 19. [Indian Agric. Res. Inst., New Delhi]

The response to photoperiod of 4 wild species of *Oryza* was studied under 3 short-day treatments viz., 8, 9 and 10 hr. Three of these species, namely *O. officinalis*, *O. australiensis* and *O. breviligulata* flowered significantly earlier than the controls under short-day conditions. The degree of sensitivity to short-day treatment varied among the species, *O. officinalis* being the most sensitive, flowering 16 days earlier under 9-hr day length. Within the 3 short-day treatments there was no significant difference as regards flowering duration. *O. perennis* did not flower under natural day length or under the 3 short-day treatments. Other vegetative characters viz., height, total number of tillers, number of reproductive tillers, panicle length and total number of grains of the 3 species which flowered were also studied. It was observed that, except for total number of tillers and number of reproductive tillers, all other characters were significantly affected by short-day treatment. The results are discussed with reference to the duration, geographical distribution and adaptive significance of the species. F. s.—D.B.

1176 MATSUSHIMA, S. and TANAKA, T. **Analysis of developmental factors determining yields and its application to yield prediction and culture improvement of lowland rice. 55. Early discrimination of non-fertilized rice-grains.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1960, **28**, No. 4, 365–6, bibl. 4, English summary. [Nat. Inst. Agric. Sci.]

The number of ovules fertilized was used as a measure of yield prediction. Starch accumulates in the mesocarp of fertilized but not of unfertilized flowers. The starch/iodine test can be used 24 hr after anthesis to determine the number of fertilized ovules. F. Eng. s.—D.B.

1177 MATSUSHIMA, S. and others. **Analysis of developmental factors determining yields and its application to yield prediction and culture improvement of lowland rice. 56. Studies on the methods for exact expression of ripening grades in rice grains.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1960, **28**, No. 4, 374–6, bibl. 3, illus., English summary. [Nat. Inst. Agric. Sci.]

The weight of grain at a given ripening stage expressed as a percentage of the weight of fully ripened grain is termed the ripening grade. Certain properties of rice grains are correlated with these ripening grades and can be used in yield prediction. These properties are : (1) specific gravity of the grain, (2) ratio of kernel weight to hull weight, (3) ratio of the width of the translucent area to that of the whole area as seen in transverse section of the grain. Of these three, the third is the most convenient and reliable to use for yield prediction. F. Eng. s.—D.B.

1178 PREVETT, P. F. **The effect of various factors on the thiamine content of rice (literature survey).** 1959, pp. 11, bibl. 32. [Lodged in the Tropical Liaison Dept, Pest Infestation Lab., Slough]

1179 SCHROEDER, H. W. and ROSBERG, D. W. **Infra-red drying of rough rice. 1. Long-grain type. Rexoro and Bluebonnet 50.** *Rice J.* 1960, **63**, No. 12, 3–5 and 23–7, bibl. 1.

SCHROEDER, H. W. **Infra-red drying of rough rice. 2. Short-grain type. Calrose and Caloro. 3. Medium-grain type. Nato and Magnolia.** *Rice J.* 1960, **63**, No. 13, 6–8 and 25–7, bibl. 3, and 1961, **64**, No. 1, 11–12 and 24–7, bibl. 2.

The results are given from trials to study the drying of paddy with infra-red radiation, using different types and varieties of rice. With all varieties, the rate of drying decreased as the initial moisture content of the grain was decreased, and increased as the irradiation period was lengthened from 10 to 25 sec. [See also *Fld Crop Abstr.* 13 : 1196.]—E.B.O.

1180 FAO. Procédés et matériel de laboratoire pour déterminer la qualité du riz. **[Laboratory procedures and equipment for determining rice quality.]** *Bull. Renseign. 15 FAO* [n.d.], pp. 51, illus. [Received Feb., 1961]

1181 NAGATO, K. and others. **On the quality of rice kernel in early season cultivation.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1960, **28**, No. 4, 359–62, bibl. 8, English summary. [Fac. Agric., Nagoya Univ., and Kyoto Liberal Arts College]

Rice grains produced by early-season cultivation are uneven in development. In some, there is a rapid accumulation of storage material at an early stage of grain formation and the starch granules become arranged radially in transverse section of the grain. Weak grains, on the other hand, develop into chalky or into milk-white grains. In a rice crop grown early, the thickness of the pericarp is increased and the embryo readily separates from the grain during cleaning. Cleaning losses are therefore high compared with crops grown in normal or late season. F. Eng. s.—D.B.

1182 DUMLAO, R. C. and others. **Dormancy periods of Philippine Seed Board rice varieties.** *Phillipp. Agriculturist* 1960, **44**, No. 5, 211–17, bibl. 13.

Standard germination tests, in which it was assumed that dormancy was broken when germination was 80% or more, were carried out at

weekly intervals after the harvest of 7 upland [not irrigated] and 8 lowland [irrigated] rice varieties. The dormancy period of the former varied from 3 to 7 weeks and of the latter from 7 to 10 weeks. A positive correlation (r = 0·672) was found to exist between the maturation- and dormancy-periods.—R.H.F.

1183 Umali, D. L. and others. **A preliminary study on the cancellation of dormancy period of rice seed.** *Philipp. Agriculturist* 1960, **44**, No. 6, 279–89, bibl. 14.

At 2 weeks after harvest, seed of the wet rice variety Peta was subjected to a number of chemical and physical treatments in order to break dormancy. Smoking, by which the seeds were exposed to wood (*Acacia*) smoke, in a chamber maintained at 120°F for 84 hr or more, gave over 80% germination. Soaking for 12 hr in a slurry of 40 ml formalin and 20 g calcium carbide gave a germination of 83%.—R.H.F.

1184 Ito, H. and Hayashi, K. **Studies on the storage of rice seeds. 1. Influences of temperature and moisture content on the longevity of rice seeds and methods of drying seeds.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1960, **28**, No. 4, 363–4, bibl. 6, English summary. [Nat. Inst. Agric. Sci.]

When stored at 0°C, seeds with a moisture content of 10–19% maintained their viability for more than 480 days. When stored at 30°C, with a moisture content ranging between 8 and 18%, the seeds deteriorated during a period of 60–430 days ; the lower the moisture content, the later the deterioration. Hot air (40–60°C) was more efficient than drying agents (quicklime or silica gel) for bringing seeds to a moisture content of 4–7%. F. Eng. s.—D.B.

1185 Dumlao, R. C. and Parker, M. B. **The influence of cold storage conditions on the viability of rice and corn seeds.** *Philipp. Agriculturist* 1960, **44**, No. 7, 327–37, bibl. 14.

Samples of 3 varieties each of rice and maize were stored either under room conditions, in which the monthly mean ranges of temperature and relative humidity were 77·0 – 85·1°F and 70·3 – 85·5%, or under " cold " storage in which the ranges were 47·9 – 74·6°F and 47·0 – 66·9%, respectively. It was found that all seeds under room storage had lost viability by 20 months but under " cold " storage germination was over 95% after 3 years.—R.H.F.

ZIZANIA AQUATICA

1186 Weir, Cynthia E. and Dale, H. M. **A developmental study of wild rice, *Zizania aquatica* L.** *Canad. J. Bot.* 1960, **38**, No. 5, 719–39, bibl. 35, illus. [Ontario Agric. Coll., Guelph]

The life history of *Z. aquatica* is traced from the appearance of the first submerged leaves in the spring until the seed is buried at the bottom of a lake in autumn. The characteristics of the 3 types of leaves are discussed. The change from the simple vegetative apex to the many-tipped, young inflorescence occurs early. The inflorescence develops acropetally, as does each spikelet. Only at the later stages can the pistillate and staminate spikelets be distinguished. A well differentiated abscission layer develops at the base of each spikelet. F. s.—R.B.

CANARY SEED

1187 Niffeneger, D. and Thies, S. A. **Seed characteristics, germination, and seedling growth of canarygrass, *Phalaris canariensis* L. as affected by genotype and seed source.** *Proc. Ass. off. Seed Anal. N. Amer.* 1960, **50**, No. 1, 87–96, bibl. 14. [Montana State Coll., Bozeman]

GENERAL

1188 Lechner, L. Die Fruchtfolge im Getreidesaatgutbau unter besonderer Berücksichtigung der Fusskrankheiten. [**Rotations in cereal seed production with special reference to foot rots (*Ophiobolus graminis* and *Cercosporella herpotrichoides*).**] *Saatgut-Wirtsch.* 1961, **13**, No. 3, 75–8. [Bayer, Landessaatzüchtanstalt Weihenstephan, Bavaria]

1189† Bonvicini, M. Specie da foraggio nell'attività selettiva dell'Istituto di allevamento vegetale di Bologna. [**Forage species selected at the Plant Breeding Institute of Bologna (Italy).**] *Sementi elette* 1960, **6**, No. 5, 56–64, bibl. 2, illus., English and German summaries.

Among the fodder varieties selected and released for cultivation are the oat var. Angelica, the barley var. Ventitre and the rye var. Cinquecento.—E.B.O.

1190 The Institute of Corn and Agricultural Merchants and the Seeds Committee of NACAM. **Notes on cereal varieties.** 1961, pp. 22, London : Cereal House, Mark Lane, 1s. 6d.

This pocket reference book contains concise tabulated information giving the main characteristics of all the cereal varieties available in the UK. Yield data have been deliberately omitted. —C.L.S.

1191 Friesen, G. and others. **Economic losses caused by weed competition in Manitoba grain fields. 2. Effect of weed com-**

petition on the protein content of cereal crops. *Canad. J. Pl. Sci.* 1960, **40**, No. 4, 652–8, bibl. 11. [Univ. Manitoba, Winnipeg]

Economic losses caused by weed competition in Manitoba grain crops were studied on 142 farm fields during the 3-year period 1956–8. Ten paired plots were located in each farm field, one-half of each paired plot being kept weed-free throughout the growing season. Percentage protein was determined in wheat, barley and oat samples collected from 60 of these farm fields. Significant increases in grain protein content were obtained following weed removal in 22 of the 60 grain fields studied, and small increases were noted in most other fields. In the combined analysis of all fields, removal of weeds resulted in significant increases ($P = 0{\cdot}01$) in both protein content and yield of wheat, barley and oats. This suggests that weeds compete very effectively with grain crops for available N and that reductions in crop yields resulting from weed competition are also generally accompanied by reductions in protein content. F. S.—R.B.

1192 Zwölfer, W. **Report to the Government of Turkey on the study and control of sunn pest.** *Rep. 1059 FAO/ETAP* 1959, pp. 15. [Received Feb. 1961]

This report is concerned particularly with the control of *Eurygaster integriceps*, *Aelia rostrata* and *A. obtusa* on cereals.—E.B.O.

1193 Škol'nik, M. Ja. and Boženko, V. P. **The necessity of boron for cereals and its significance for nitrogen metabolism.** [Russian] *Trudy Bot. Inst. V. L. Komarova* (*Trudy Inst. bot., Acad. Sci. USSR* (*4*) *Exp. Bot.*) 1960, Ser. 4, No. 14, 284–303, bibl. 47, illus., English summary.

1194 van Dobben, W. H. De invloed van de daglengte op overwinterende gewassen. [**The effect of daylength on overwintering crops.**] *Jaarb. Inst. Biol. Scheik. Onderz. LandbGew. 1960* 1960, 85–96, bibl. 13, illus., English summary.

In experiments with spring cereals grown at different temperatures and photoperiods, there were indications that daylength requirements for floral induction were somewhat lowered at low temperatures. Petkus winter rye, Vinesco winter barley, the winter-wheat varieties Bonus, Merlin, Cappelle Desprez, Staring and Carstens VI, and the spring-wheat variety Peko, grown in pots in the open, were transferred, at 14-day intervals beginning on 2 Feb., to a glasshouse at 16°C and there given natural daylength or continuous illumination. Vernalization was found to be complete on 2 Feb., but not photoperiodic induction, except in barley; supplementary light had no effect on heading in this crop. Additional light accelerated heading in rye and wheat, but to a less extent as the date of transfer to the glasshouse was delayed. The greatest acceleration of heading occurred in winter rye, the floral induction of which was estimated to be complete by 5 April, the same date as for Bonus wheat. Complete floral induction occurred later in the other varieties, the latest variety being the N. German var. Carstens VI (23 April). Peko, Carstens VI and Merlin appeared to be more sensitive to daylength than the other 3 wheat varieties. These varietal differences in photoperiod may be an adaptation to differences in natural daylength in the areas of origin of the varieties. The 2–3 weeks between the vernal equinox and the date of complete induction appear to be decisive in determining the earliness of a variety. Experience has shown that northern varieties grown in the Netherlands are often late compared with southern varieties.—R.B.

1195 Pulpán, J. and Verner, P. H. Roztoci zijící na uskladneném obilí a boj proti nim. [**Mites infesting stored grain and their control.**] *Bohemia centralis* (*A*) 1959, **1**, No. 4, 173–292, bibl. 240, German summary. [From English summary seen in *Grain Storage News Lett.* 1961, **3**, No. 1, 14–19.]

This concerns the use of the predacious mite *Cheyletus eruditus* for controlling *Tyroglyphus farinae* and *Glycyphagus destructor* infesting stored grain. If *C. eruditus*, which is abundant in Czechoslovakia, appears before 15 June, it can control *T. farinae* and *G. destructor*, provided that these do not heavily infest the grain. When the biological balance was disturbed by fumigation, *C. eruditus* re-established itself much more slowly than either *G. destructor* or *T. farinae* and was no longer capable of eliminating them. *C. eruditus*, introduced artificially into stored grain, can give effective control of the pests provided that the ratio of predators to pests is 1 : 75 – 1 : 100 and that this ratio is maintained. Subsequent cannibalism among *C. eruditus* reduces further the total mite population.—E.B.O.

1196 Theimer, O. F. Rapport au Gouvernement de la République Arabe Unie (Province syrienne) sur un programme de construction d'entrepôts à grain. [**Report to the Government of the United Arab Republic (Province of Syria) on a programme for the construction of grain silos.**] *Rep. 1054 FAO/ETAP* 1959, pp. 37, illus. [Received Feb., 1961]

1197 Körting, A. Schädigung lagernden Saatgutes durch Holzschutzmittel. [**Damage to stored [cereal] seeds by wood preservatives.**] *NachrBl. dtsch. PflSchDienst., Braunschweig* 1960, **12**, No. 5, 70–4, bibl. 8, illus., English summary. [Biol. Bundesanst., Inst. f. Forstpflanzenkrankheiten, Hannover/Münden, German Fed. Rep.]

LEGUMES

COWPEAS

1198† Gargantini, H. and Wutke, A. C. P. Fixação do nitrogênio do ar pelas bactérias que vivem associadas às raízes do feijão de porco e do feijão baiano. [**Fixation of atmospheric N by root bacteria associated with sword bean and cowpea.**] *Bragantia* 1960, **19**, No. 40, bibl. 12, illus., English summary. [Inst. Agron. Campinas, São Paulo, Brazil]

Plants of sword bean (*Canavalia ensiformis*) and cowpea (*Vigna sinensis*) were grown in pots each filled with 6 kg of " terra-roxa-misturada " soil, and applications of the following were compared : (a) NPK ; (b) NPK and limestone ; (c) NPK and inoculant ; (d) NPK, limestone and inoculant ; (e) PK and limestone ; (f) PK, limestone and inoculant ; (g) control. The amounts of N, P_2O_5 and K_2O, where applied, were 2, 2·2 and 3 g, respectively, per pot. Nitrogen determinations were made in the soil, the aerial parts of the plants and in the roots. Both species showed a good capacity for fixing atmospheric N but cowpea was the more effective. The amounts of N fixed in the pots that received the best treatment (f) were equivalent to 48·5 kg/ha for sword bean and 73 kg/ha for cowpea. It is concluded that both legume species are suitable for green manure. —E.B.O.

SOYABEANS

See also Abs. 1111, 1403.

1199 Smartt, J. **A guide to soya bean cultivation in Northern Rhodesia.** *Rhod. agric. J.* 1960, **57**, No. 6, 459–63, bibl. 3. [Mount Makulu Res. Sta.]

The results of trials with 9 varieties of soyabean as regards fertilizer, time of sowing, plant population, number of cultivations, and fungicides are tabulated. Sowing in late Nov. or early Dec. was better than delaying until late Jan. Highest yields were obtained from spacings allowing 108 sq. in. or less per hill. One cultivation doubled the yield as compared with that from the control, and further cultivations increased yield only slightly.—R.H.F.

1200 Novak, A. G. [**Prospects for cultivating soyabean in the Far East [of USSR].**] [Russian] *Vestn. S.-H. Nauki* (*J. agric. Sci. USSR*) 1961, **6**, No. 2, 11–16, English, German and French summaries.

1201 Camper, H. M. and others. **The effect of location and date of planting on adaptability of soyabean varieties of varying maturities.** *Res. Rep. Va agric. Exp. Sta. 1957-9* 1960, 91–2. [Received March, 1960]

Six soyabean varieties were sown at 4 locations at 2-week intervals from 5 May to 5 July. Late May and early June sowings tended to give the best yields regardless of variety or location. Earlier sowings gave poorer seed quality than later ones, especially in early-maturing varieties. Seed of early varieties was poorer and deteriorated more rapidly in areas with a longer growing season than where cooler autumn weather followed maturity of the beans.—A.M.H.

1202 Woodruff, C. M. and others. **How potassium caused boron deficiency in soybeans.** *Bett. Crops* 1960, **44**, No. 4, 4–8 and 11, illus. [Missouri Agric. Exp. Sta.]

Replicated pot tests using single soyabean plants in an acid-leached soil containing varying amounts of K, Mg and Ca added, showed a sharp maximum in bean yields [no details given] at the 2% K saturation level (280 lb K_2O/ac). Subsequent trials using 7 additional minor elements revealed that boron was the limiting factor and that, when added at the rate of 2 lb/ac, yields of soyabeans increased steadily up to a K level of 20% cationic exchange capacity (highest level tested). The results of foliar analysis (data tabulated) suggested that an explanation of the K/B interaction may be in the suppression of Ca and Mg uptake when B is in deficient supply.—R.H.F.

1203 Miller, R. J. and others. **Soybean yield responses to fertilizers.** *Soybean Dig.* 1961, **21**, No. 5, 6–8, illus. [Iowa]

The best correlation between yield and foliar analysis was obtained by determining the K content of the upper leaves and leaf petioles harvested just after flowering.—R.H.F.

1204† Washko, J. B. **Soybean varieties for forage and grain in Pennsylvania.** *Bull. 666 Pennsylvania agric. Exp. Sta.* 1960, pp. 9.

In central and south-eastern Pennsylvania the highest forage yields were obtained from late varieties reaching the hay stage from 8–10 Sept., but in the north there was little to choose between early, mid-season and late varieties. In the former areas late varieties also gave the highest yields of seed, but early varieties had the highest seed protein content. Oil content was irregular.—J.D.J.

1205 Seed World. **Rebel — a new soybean.** *Seed World* 1960, **86**, No. 2, 13.

The soyabean var. Rebel is briefly described. It has yielded as much as 10 bu/ac more than other varieties of the same maturity group. Its seed does not shatter and so it can be readily harvested by combine.—A.M.H.

1206 Caviness, C. E. and Taylor, M. **Effect of Johnsongrass [*Sorghum halepense*]**

on soybean yields. *Ark. Fm Res.* 1960, **9**, No. 3, 2, illus. [Northeast Br. Sta., Keiser, Arkansas]

1207 Nation, H. A. **Preplant treatments with dowpon for the control of Johnsongrass in soybean fields.** *Down to Earth* 1961, **16**, No. 4, 16–17, bibl. 2, illus. [Agricultural Chemicals Development, Greenville, Mississippi]

1208 Meade, J. A. and Santelmann, P. W. **Weed control in Maryland soybeans.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 253–8. [Maryland Agric. Exp. Sta., College Park]

Various herbicides were applied to soyabeans, both pre- and post-emergence, in 1958 and 1959. The use of dinoseb resulted in good weed control and increased yields, but timing of post-emergence sprays was critical. CDAA at 3 and 4 lb/ac and NPA (N-1-naphthylphthalamic acid) at 2 and 4 lb/ac gave fair initial weed control, but this did not persist until the 2nd rating in July. Amoben at 2 and 4 lb/ac, DAC-893 at 4 lb/ac and zytron (O-2,4-dichlorophenyl O-methyl isopropylphosphoramidothioate at 12 lb/ac were promising. The use of EPTC gave very good weed control and highly significant yield increases. The initial injury and some stand reduction did not affect yield. Granular herbicides generally gave the same results as their liquid counterparts. F.s.—A.M.H.

1209 Sutherland, M. L. and others. **The response of soyabeans to several substituted benzoic acids.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 31–9, bibl. 3. [Amchem Products, Inc., Ambler, Pennsylvania]

Soyabeans (grown in Hoagland's solution) showed the greatest tolerance to 3-nitro-2,5-dichlorobenzoic acid, although strong formative effects appeared at concentrations of 10 ppm. and above. No formative effects were produced by 3-amino-2,5-dichlorobenzoic acid even at 20 ppm., but concentrations above 5 ppm. reduced top and root growth of soyabeans. Both these compounds were used for selective weed control in soyabeans, but the corresponding 6-nitro- and 6-amino-isomers caused strong formative effects. F. s.—A.M.H.

1210 Miller, G. W. and others. **Chlorosis in soybean as related to iron, phosphorus, bicarbonate, and cytochrome oxidase activity.** *Pl. Physiol.* 1960, **35**, No. 5, 619–25, bibl. 20. [Utah Agric. Exp. Sta., Logan]

Hawkeye soyabean and a chlorosis-susceptible variety, PI–54619–5–1, were grown in soil and in nutrient solutions using split-medium and split-root techniques to separate iron from the precipitating effects of bicarbonate (using $NaHCO_3$) and phosphorus. Development of chlorosis was found to be related to high phosphorus level but not to bicarbonate concentration.—R.H.F.

1211 Higdon, W. T. and Marshall, C. E. **The uptake of Ca and K by young soybean plants.** *Res. Bull. 716 Missouri agric. Exp. Sta.* 1959, pp. 28, bibl. 23, illus.

1212 Ahmed, S. and Evans, H. J. **Cobalt : a micronutrient element for the growth of soybean plants under symbiotic conditions.** *Soil Sci.* 1960, **90**, No. 3, 205–10, bibl. 7, illus. [N. Carolina Agric. Exp. Sta., USA]

The effect was investigated of small amounts of Co on the growth of soyabean plants grown under controlled conditions in nutrient solutions lacking combined N, so that they were forced to depend upon symbiotic N fixation. Plants in culture solution without added Co were severely retarded in growth and displayed a leaf chlorosis similar to that caused by N deficiency. Four of 16 Co-deficient plants died. The addition of 0·1–1 part per billion of Co to nutrient solutions throughout the growth period resulted in normal plant growth. The addition of small amounts of Co to severely deficient plants removed the symptoms on all new growth within 10–21 days. The percentage total N in shoots and the chlorophyll content of leaves were markedly decreased in Co-deficient plants. Nodules from plants grown in culture solutions supplied with Co contained much greater concentrations of vitamin B_{12} than those from plants grown in Co-deficient solutions. The results from these experiments provide strong evidence that Co is an essential element for the growth of soyabean plants under symbiotic conditions. F. s.—E.B.O.

1213 Kahn, V. and others. **Fat metabolism in germinating soybeans. 1. Physiology of native fat.** *Pl. Physiol.* 1960, **35**, No. 6, 854–60, bibl. 31. [Univ. Illinois, Urbana]

1214 American Soybean Association. **The soybean blue book 1960.** [n.d.], pp. 144, Hudson, Iowa : American Soybean Association, $5·00.

This publication contains statistics on production, prices and utilization of soyabeans, soyabean meal and oil in the USA. It also gives directories of organizations, governmental agencies and business firms connected with the soyabean industry.—A.M.H.

GROUNDNUTS

1215 Alexander, M. W. and others. **Peanuts.** *Res. Rep. Va agric. Exp. Sta. 1957-9* 1960, 93–104. [Received March, 1960]

The effect of seed size on yield of nuts and hay and on quality was studied in the groundnut var. Virginia Bunch 46–2. Seed size ranged from 120 kernels/oz to 20 kernels/oz. Yield increased as seed size increased. The percentage of extra

large kernels also increased as seed size increased, but the number of extra large kernels per oz was fairly constant. At the first 2 sampling dates the dry-matter content of hay increased as seed size increased, but by Aug. there were no significant differences in dry-matter content. Row spacings of 14–18 in. (normal 30–36 in.) gave increased yields, but there was considerable variation from year to year. Granular forms of thimet and disyston were promising for control of tobacco thrips (*Frankliniella fusca*) on groundnuts. A study was made of the comparative effects on stem rot (*Sclerotinia rolfsii*) of groundnuts of (a) deep covering of the winter cover crop and surface litter compared with shallow covering, and (b) " non-dirting " weed control by cultivation with no soil thrown into the groundnut row compared with " dirting " weed control with soil thrown into the row. The combination of deep covering and non-dirting was consistently best in preventing infection and increasing yield. Recommended rates (lb/ac) of nematocides for use against nematodes attacking groundnuts are : D-D, 100 ; D, 70 ; EDB, 12 ; DBCP, 6. The use of various crop rotations for control of nematodes attacking groundnuts is discussed. In tests in 1958 and '59 removal of blooms from groundnut plants without virus infection produced a rosette-like disorder. Preliminary results indicated that unless a high level of Ca is maintained in the fruiting zone a small amount of K may reduce podfill and kernel quality. Four weekly foliar sprays of various nutrients applied at the flowering stage had no significant effect on yield or quality of groundnuts. Data are given on the production potential of single plants under field conditions. In 1954–8, groundnut yields were similar whether all the fertilizer was applied to the previous maize crop or half to the maize and half to the groundnut crop. The percentage extra large kernels was significantly lower in groundnuts grown on plots fertilized the same year, and was frequently highest on the unfertilized control plots. In tests of seed disinfectants, 6 oz-arasan/100 lb seed was significantly better on seed of poor quality than the previously recommended 3-oz treatment and was more effective than other disinfectants tested. DNBP was the most satisfactory herbicide for use on groundnuts. Tests in 1957–9 indicated that applications of 4·5 or 6 lb DNBP/ac when weed seeds were germinating gave more consistent weed control than 9 lb/ac applied as a pre-emergence treatment shortly after sowing. For post-emergence treatment 6 lb/ac was the optimum rate.—A.M.H.

1216 Bussler, W. Manganmangel bei Erdnüssen. **[Manganese deficiency in groundnuts.]** *Z. PflErnähr. Düng.* 1960, **90**, No. 1/2, 1–4, bibl. 17, illus. [Inst. PflErnähr., Techn. Univ. Berlin, Germany]

1217 Prakash, S. **The endosperm of *Arachis hypogaea* Linn.** *Phytomorphology* 1960, **10**, No. 1, 60–4, bibl. 13, illus. [Dep. Bot., Univ. Delhi, India]

1218 Green, A. A. **The control of insects infesting groundnuts after harvest in the Gambia : 3. The effect of decortication on the infestation of groundnuts by *Tribolium castaneum* (Hbst.) and other insects.** *Trop. Sci.* 1960, **2**, No. 3, 130–3, bibl. 8, illus. [Pest Infest. Lab., Agric. Res. Coun., Slough]

Observations are reported on the extent of infestation by *Tribolium* spp. of bagged decorticated groundnuts given 3 protective treatments, over a period of 16 weeks. The trials showed that heavy infestations developed rapidly in all treatments. It was concluded that fumigation would be necessary after decortication unless rapid shipment could be arranged to obviate storage.—R.H.F.

1219 Rhynehart, T. **The control of insects infesting groundnuts after harvest in the Gambia : 4. The practical application of control measures.** *Trop. Sci.* 1960, **2**, No. 3, 134–9, bibl. 4. [Pest Infest. Lab., Agric., Res. Coun., Slough]

Farmers receive free allocations of lindane dust for treatment of their seed groundnuts against attack by the borer *Caryedon gonagra*. [For details of treatment recommended see *Fld Crop Abstr.* 14 : 228.] Since 1959, the policy has been to encourage the use of village stores and treatment centres rather than to rely on the farmer himself to carry out the treatment. Control measures have been far more effective with seed nuts than with nuts for export.—R.H.F.

PEAS

1220 Balašov, I. **[Sowing rates for vetch and peas when sown with fodder grain.]** [Russian] *Sel'hoz. Sibiri (Agric. Siberia)* 1960, **5**, No. 12, 43–4.

An experiment made in the Tjumen area [57°N., 68°E.] is reported.—M.H.

1221 De Rinaldini, V. Il pisello per l'industria conserviera. **[Peas for canning (in Italy).]** *Ital. agric.* 1960, **97**, No. 10, 965–72, illus. [Sta. Sper. Industr. Conserve, Parma, Italy]

1222 Pea-Growing Research Organization, Ltd. **Annual Report 1959.** 1960, 11, 13, 14 and 15, Yaxley, Peterborough : Pea-growing Res. Org. Ltd.

1. Weed control. Recent new herbicides were evaluated in experiments on 3 soil types for controlling wild oat and broad-leaved weeds in

marrowfat peas. Pre-sowing applications of propham, chlorpropham and fenuron were effective against wild oat and broad-leaved weeds ; also pre-emergence applications of atrazine and simazin and post-emergence applications of dinoseb. Pre-emergence applications of propazine, trietazine, amiben and certain other formulations of propham, chlorpropham and fenuron were effective against broad-leaved weeds only. The standard adopted for comparison was the recommended treatment of 3 lb propham, wettable powder, in 50 gal of spray per acre, and no other chemical proved as effective as this against wild oat. In a separate test it was found that the pre-sowing interval should be not less than 4 days before drilling.

2. Evaluation of new vining varieties. With the object of extending the processing season, 16 quick-maturing varieties were sown in mid-March, with Meteor and Thomas Laxton as standards, and 8 slow-maturing varieties in mid-May, with Lincoln as standard. Kelvedon Wonder and Dark Skin Perfection were included in each trial as cross-checks. Records were taken of haulm length, maturity period, yield, pea size and colour. The peas were then canned under standard conditions. Canning and quick-freezing properties were assessed at the Campden Research Station. Eight early varieties and 4 late ones are listed for further attention.

3. Spacing for vining peas. Four varieties were tested on 2 soil types at 2 row-widths and 3 intra-row spacings. Narrow rows (8 in.) consistently outyielded wide rows (16 in.). Meteor and Thomas Laxton gave their best yields at 1-in. spacing within the row, but Lincoln and Witham Wonder branched more freely and yielded best at 2-in. spacing. There were no important differences in other characters attributable to spacing.

4. Desiccation and prevention of shedding. In 2 trials sodium monochloracetate and diquat applied in late July reduced the moisture content of seeds to 16–18% 4 days ahead of untreated peas, but the season was a very dry one.—J.D.J.

1223 Patterson, T. M. **Weed control in peas and maize.** *Proc. 13th N.Z. Weed Control Conf.* 1960, 76–81, bibl. 1. [Rukuhia Soil Res. Sta., Hamilton, N.Z.]

Trials have shown that peas tolerated 15 lb of sodium monochloracetate (MCA) from the 4th-node stage of growth. Promising results were obtained with the application of mixtures containing MCA and MCPB for the control of such weeds as *Chenopodium album*. In maize crops 2 chemicals of the triazine group gave excellent weed control, but this did not result in higher crop yields than with the amine salt of 2,4-D. F. s.—M.H.

1224 Davis, A. C. and others. **Control of pea enation mosaic in peas with insecticides.** *J. econ. Ent.* 1960, **54**, No. 1, 161–6, bibl. 13. [New York State Agric. Exp. Sta., Geneva]

In 1955, foliar applications of parathion and demeton (both at 0·25 lb active ingredient/ac) were made on Perfection and Pluperfect varieties of pea. Three applications of parathion at weekly intervals reduced the incidence of pea enation mosaic and other non-persistent types of virus disease. Increased yields of peas were obtained from the treated plots but not always in relation to the degree of virus-disease control obtained. Treating seed with demeton (1 oz a.i. in 0·5 pt 2% methocel solution per 54 lb of seed) was not as effective as foliar applications, and it reduced seedling emergence.—R.H.F.

1225 Brouwer, R. and van Vliet, G. De invloed van de worteltemperatuur op groei en opname bij erwten. **The influence of root temperature on growth and uptake in peas.** *Jaarb. Inst. Biol. Scheik. Onderz. LandbGew. 1960* 1960, 23–36, bibl. 8, illus., English summary.

Peas were grown with 17 hr light/day, their tops in air at 20°C and 65% R.H., and their roots (a) in culture solution at 5, 10, 15, 20°C ; (b) at 5, 10, 15, 22, 31°C either in regularly changed culture solution or for alternate periods of 2 days in culture solution and 2 days in tap-water ; (c) in culture solution, initially at 20°C and then transferred at varying growth stages to 5, 10, 15, 22 or 31°C. Results indicated that (1) the increase in fresh weight and dry weight of stems, leaves and roots was greatest at a root temperature of 22°C ; (2) optimum uptake of water, K, and nitrate occurred at the same temperature ; (3) ion uptake in experiment (b) was linearly related to fresh weight within the range 5–15°C, whereas at higher temperatures relatively more N and relatively less K was absorbed ; (4) the transpiration coefficient increased with root temperature. During the growing period the optimum root temperature became lower ; results from (c) showed that this was related to the duration of the root temperature treatment and not to ageing. It was considered that, at the higher root temperatures, growth was limited by the K supply, whereas at the lower temperatures the water supply was limiting.—R.B.

BEANS

1226 Picard, J. and Sigwalt, C. Liaison entre peuplement et rendement en grain chez la féverole (*Vicia faba* L.). [**Relationship between plant density and grain yield in field beans (*V. faba*).**] *Ann. Amélior. Pl., Paris* 1960, **10**, No. 2, 169–75, bibl. 3, English, German and Russian summaries. [Sta. Amélior. Pl., Dijon, France]

In trials in 1954–6 with 2 varieties of field beans, 4 plant densities, 20, 40, 60 and 80 plants/m², and 2 inter-row spacings, 20 and 40 cm, were tested.

Results indicated that the optimal plant density was about 45 plants/m² for a large-seeded variety and 50–55 plants/m² for a small-seeded variety. The relationship of seed yield to plant density in field beans is expressed by an equation (given) ; it is not affected by inter-row spacing.—E.B.O.

1227 Last, F. T. and Nour, M. A. **Cultivation of *Vicia faba* L. in northern Sudan.** *Emp. J. exp. Agric.* 1961, **29**, No. 113, 60–72, bibl. 19. [Gezira Res. Sta. Wad Medani, Sudan]

Winter-sown broad beans were heavily infected with *Leveillula taurica*, *Erysiphe umbelliferarum* and *E. polygoni*. Spraying 2 or 3 times with lime sulphur decreased the incidence of these powdery mildews, and increased yields by 23% on average. The increases were highest with crops sown at the optimal date. At Shambat in 2 of 3 trials, the highest yields were obtained from sowing in early Nov. At Zeidab, 170 miles N. of Shambat, high yields were obtained from sowing during mid-Oct. to early Nov. N fertilizer increased mean yields significantly. P and K applied separately did not affect yields, but applied together increased them as much as N. F. s.—E.B.O.

1228 Way, M. J. **Bean aphid control on field beans in relation to the flowering period and to honey bee poisoning.** *Pl. Path.* 1961, **10**, No. 1, 14–20, bibl. 13. [Rothamsted Exp. Sta., Harpenden]

LUPINS

1229† Mirvis, D. A. **[Agrotechnics for fodder lupin grown for seed in western White Russia.]** [Russian] *Zemledelie* (*Agriculture, USSR*) 1961, **23**, No. 4, 62–5.

1230† Larsen, S. and Gunary, D. **Phosphate requirements of lupins grown as a pioneer crop on Culm Measure soil with impeded drainage.]** *Nature, Lond.* 1961, **189**, No. 4765, 691, bibl. 2. [Levington Res. Sta., Dep. Soil Sci., Ipswich]

From experiments made at the North Wyke Exp. Sta., Devon, there is no support for the assumption that lupins are able to obtain P from relatively insoluble soil phosphates. Lupins can thrive without phosphate application, even on soils with very low phosphate status, probably because they are able to obtain phosphate from deep layers of the subsoil which are beyond the reach of more shallow-rooting crops.—M.H.

1231 Birecka, Helena and Włodkowski, M. Reakcje niektórych roślin motylkowych na stopień zaopatrzenia w fosfor w pierwszym okresie wegetacji. **Reaction of some leguminous plants to the phosphorus supply in early stages of vegetation.** *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 3, 511–43, bibl. 10, English and Russian summaries.

In pot trials with peas and lupins grown in sand, P was applied (a) prior to sowing, and (b) 29 days after the germination of peas and white lupins, and 32 days after the germination of blue and yellow lupins. The plants were harvested at 1-week intervals beginning with 23 – 28 May ; 25 June was the final harvesting date for peas, 27 June for white lupins, 1 July for blue lupins and 2 July for yellow lupins. Plants of each harvesting date were analysed for dry matter, total P, inorganic and organic P soluble and insoluble in 8% trichloracetic acid, and for total N. The level of pre-sowing P and the lack of P during the first 4 weeks of growth did not influence the time of flowering. The advantage of a better pre-sowing supply of P was noted in peas and blue lupins, while yellow and white lupins showed a negligible reaction. Shortage of P had a considerable effect upon plant weight in peas and blue lupins, much less in yellow lupins and none in white lupins, and *Rhizobium* activity decreased in all the plants. During the phosphorus-short period the relative content of P of the lipid-protein fraction diminished in all the plants except yellow lupins, and especially in white lupins. By the end of this period, the soluble organic fraction was much higher in yellow and white lupins than in peas and blue lupins. At this time a relatively great amount of inorganic P was noted in all the plants. After applying P during the next 20-day period, differences in dry matter were significant in peas and blue lupins compared with control plants, and, in spite of increased *Rhizobium* activity, considerable differences in N content remained. In this respect, yellow and white lupins equalled the plants supplied with P prior to sowing. An intensive synthesis of organic P compounds, and especially of lipid-protein compounds, occurred a short time after the application of P, no differences being noted between species. The different reaction of these legumes to P shortage in the first weeks of growth may be connected with differences in the metabolism of their organic compounds soluble in trichloracetic acid. F. Eng. s. —G.M.R.

1232† Graham, P. H. and Barker, C. A. **Leghaemoglobin and symbiotic nitrogen fixation.** *Aust. J. Sci.* 1961, **23**, No. 7, 231–2, bibl. 11.

An investigation of the relationship between leghaemoglobin and symbiotic nitrogen fixation, using the Western Australian blue lupin (*Lupinus digitatus*), showed a very highly significant positive correlation between the concentration of leghaemoglobin in the nodule and the amount of nitrogen in the tops. The rhizobia used were selected to give a range of symbiotic effectiveness.

Since the sand used in the experiment was almost completely devoid of N, N gains can be ascribed to symbiotic fixation. These results support the view that leghaemoglobin concentration can be used as a guide to the symbiotic effectiveness of associations in the field.—J.D.

1233† Mironenko, A. V. **[The qualitative composition of alkaloids in *Lupinus*.]** [Russian] *Doklady Akad. Nauk BSSR (Proc. Acad. Sci. Beloruss.)* 1961, **5**, No. 2, 89–91, bibl. 9, illus. [Biol. Inst., Acad. Sci. White Russia]

1234† Manokina, N. **[Measures which hasten the ripening of fodder lupin.]** [Russian] *Sel'hoz. Sibiri (Agric. Siberia)* 1960, **5**, No. 12, 46.

The use of a vernalizator [apparatus for subjecting material to low temperatures] and of defoliants is discussed.—M.H.

1235† Atabekova, A. I. **White lupin and its intraspecific differentiation.** [Russian] *Izv. Timirjazevsk. S.-H. Akad. (Bull. Timirjazev agric. Acad.)* 1961, No. 1 (38), 192–7, bibl. 12, illus., English summary.

Lupinus albus has been divided into the following 6 types : Georgian, South-western (Algerian), Abyssinian, West-European (Swiss), Central-European (German) and Palestinian. F. Eng. s.—M.H.

PIGEON PEAS

1236 Sánchez-Nieva, F. and others. **Maturity indices for pigeonpeas.** *J. Agric. Univ. P.R.* 1960, **44**, No. 2, 60–9, bibl. 9.

The following seed characters could be used as an index of maturity of pigeon peas (*Cajanus cajan*) : content of moisture, starch, alcohol-insoluble solids and total solids ; specific gravity ; and intensity of green pigmentation.—R.H.F.

CYAMOPSIS TETRAGONOLOBA

1237 Poats, F. J. **Guar, a summer row crop for the Southwest [USA].** *Econ. Bot.* 1960, **14**, No. 3, 241–6, illus.

The crop is described in terms of its potential place as a supplier of industrial gum in a market assessed at 100 million lb/yr.—R.H.F.

GENERAL

See also Abs. 1457.

1238† Masefield, G. B. **The effect of irrigation on nodulation of some leguminous crops.** *Emp. J. exp. Agric.* 1961, **29**, No. 113, 51–9, bibl. 4. [Oxford Univ. Fld Sta.]

In field trials on clay soil over 4 seasons in which the main crops used were *Vicia faba*, *Pisum sativum* and *Phaseolus vulgaris*, irrigation water was supplied at regular intervals irrespective of weather, but in smaller quantities when the soil was wet. The results showed that irrigation may increase plant weight in a dry season, or more rarely depress it in a wet one. The number of nodules was increased by irrigation in all trials but one, though not all the increases were significant. The weight of nodules on the plants showed an increase in all cases, and more of the results were significant. In general, irrigation increased the size as well as the number of nodules, though not usually by so large a percentage. With *V. faba* and *P. sativum*, the nodules of which are attacked by larvae of *Sitona lineata*, irrigation effected a degree of control of these larvae and so prolonged the life of the nodules. F. s.—E.B.O.

1239† Mulder, E. G. and van Veen, W. L. **The influence of carbon dioxide on symbiotic nitrogen fixation.** *Plant and Soil* 1960, **13**, No. 3, 265–78, bibl. 17, illus. [LandbHogesch. Wageningen, Netherlands]

Peas (*Pisum sativum*) and red clover (*Trifolium pratense*) were grown in culture solutions at pH 4·8 and pH 6·4 aerated with air containing 0 and 4% CO_2. The presence of CO_2 in the culture solution was found to be essential for optimum nodulation and N-fixation by red clover. In its absence, fewer root nodules were formed and these were mainly concentrated along the principal roots, whereas in its presence the nodules were distributed throughout the root system. Nodules of red clover fixed more N in the presence than in the absence of CO_2 ; the cause may have been a more liberal supply of α-keto acids, which were present in the nodules of plants grown in culture solution supplied with CO_2. The effect of CO_2 on N-fixation was more pronounced at pH 4·8 than at pH 6·4. When provided with nitrate-N, clover plants did not respond to the presence of CO_2 in the culture solution. In some experiments, treatment of an acid soil with CO_2 promoted nodulation and N-fixation in red clover, while in other experiments the treatment had no effect. At pH 4·8, peas responded strongly to the presence of CO_2 ; the number of nodules formed was not affected, but N-fixation was considerably increased. Growth was considerably reduced in the absence of CO_2. F. s.—R.B.

1240† Dorosinskiĭ, L. M. and others. **[The role of nodule bacteria in the N nutrition of leguminous plants.]** [Russian] *Agrobiologija (Agrobiology, Moscow)* 1960, No. 4 (124), 594–602, bibl. 10, illus. [All-Union Sci. Res. Inst. Agric. Microbiol., Leningrad]

1241† Galli, F. Caracteres culturais das bactérias dos nódulos de algumas leguminosas

tropicais. [**Cultural characters of nodule bacteria of some tropical legumes.**] *An. Esc. Agric., Queiroz* 1959, **16,** 113–22, bibl. 13, English summary. [Received May, 1961]

The results are given from laboratory tests to determine the cultural and physiological characteristics of the nodule bacteria of 13 legume species. Cross-inoculation trials with these same species were reported elsewhere. [See *Fld Crop Abstr.* 12 : 749.]—E.B.O.

1242 Indian Council of Agricultural Research, New Delhi. **Bibliography on pulse crops.** *Indian Counc. agric. Res. Conf. Res. Workers on Pulses Hyderabad (A.P.) Sept. 1960,* pp. 104.

This is a classified bibliography, primarily under crops, of which there are 21, and secondarily under subject, e.g. seeds, botany and genetics, microbiology, rotations, manuring, diseases, pests, nutritive value, green manure.—D.B.

ROOT CROPS

SUGAR-BEET

1243 Lionti, R. Prove di coltivazione della barbabietola da zucchero in Tripolitania. [**Trials on growing sugar-beet in Tripolitania.**] *Riv. Agric. subtrop.* 1960, **54,** No. 10–12, 782–91, bibl. 6, illus.

The results from trials on about 9 ha, in 1954–9 showed that there are possibilities for growing sugar-beet during autumn/winter in Tripolitania. The best sowing period is 10–31 Oct. The vegetative cycle is 225 days, which is 75 days longer than with plants grown in spring/summer. —E.B.O.

1244 Hammerton, J. L. **Studies of the effects of soil aggregate size on the emergence and growth of beet (*Beta vulgaris* L.). 1. Seedling emergence.** *J. agric. Sci.* 1961, **56,** No. 2, 213–28, bibl. 22, illus. [Dep. Agric., Univ. College Wales, Aberystwyth]

In trials using sugar-beet and fodder-beet a fine soil separate gave the highest and most rapid seedling emergence. This was considered to be due to its better moisture supply and lower mechanical impedance compared with coarser seedbeds. There was no evidence that natural seed clusters were any less responsive to soil aggregate size than processed beet-seed clusters. Consolidation [of soil] slightly hastened emergence though the mechanism of this is not clear. Sowing at 0·75 in. was superior to deeper sowing (1·5 in.) in both speed of emergence and ultimate emergence. This was partly an effect of decreased mechanical impedance, and partly due to the shorter period over which the seedlings were susceptible to pathogens. Heavy dressings of soluble fertilizers delayed emergence, but had no effect on the ultimate emergence. F. s.—E.B.O.

1245 Blake, G. R. and others. **Effect of soil compaction on development and yield of sugar beets.** *J. Amer. Soc. Beet Technol.* 1960, **11,** No. 3, 236–42, bibl. 11, illus. [American Crystal Co. Farm, East Grand Forks, Minnesota]

Details are given of the methods of soil compaction used and their effect on certain soil characteristics. Crop results (2-yr average) for the compacted and non-compacted plots, respectively, were : beet yield in tons/ac, 18·8 and 21·6 (significant at 0·1% in second year only) ; percentage by weight of forked or branched roots, 38·9 and 18·6 (significant at 0·1% for both years). There was no appreciable difference in the sucrose content of beets on compacted and non-compacted soils.—R.H.F.

1246 Screiber, K. **Effect of planting direction on yield of sugar beets.** *Rep. Ann. Conf. Manitoba Agronomists* 1959, 59–60.

In experiments conducted in 1956–8, unfertilized plots of sugar-beet sown in a N. – S. direction consistently yielded better than those sown in an E. – W. direction. In a spacing test carried out in 1959, at 16-in. and 22-in. inter-row spacings, yields were higher in plots sown N. – S., while at a 28-in. inter-row spacing the plots sown E. – W. yielded more. Soil temperature and moisture content were slightly higher in the N. – S. plots at all 3 spacings.—A.M.H.

1247 Snyder, F. W. **Influence of the seedball on speed of germination of sugar beet seeds.** *J. Amer. Soc. Sug. Beet Technol.* 1959, **10,** No. 6, 513–20, bibl. 8, illus. [Crops Res. Div., Agric. Res. Serv., U.S.D.A., East Lansing, Michigan]

Experiments were designed to evaluate some of the effects of the physical and chemical factors of the seedball of sugar-beet on the speed of germination. The liquid-contact method of germination was used. Seedballs notched to expose part of each true seed germinated more rapidly than whole seedballs of the same variety. Varieties differed in the degree of tightness of the seed cap over the true seed. Soaking sugar-beet seed in water before germination had no consistent effect on percentage germination. Seedballs of the variety US 401 did not appear to contain enough chemical inhibitors to delay germination. Whole seedballs from 2 plants of US 401 germinated more rapidly than naked seeds from the same seedlots, indicating a stimulating effect of the seedball. The growth of the seedlings was also stimulated by the seedballs. F s.—A.M.H.

1248 Adams, S. N. **The effect of time of application of phosphate and potash**

on sugar beet. *J. agric. Sci.* 1961, **56**, No. 1, 127–30, bibl. 2. [Rothamsted Field Sta., Dunholme, Lincoln]

In 29 experiments on sugar-beet in 1957–9, ploughing-down of phosphate and potash in the previous autumn was compared with spring application before the seed-bed preparation. In both the wet summers of 1957 and 1958 and the dry summer of 1959, spring application gave, on average, a higher yield of sugar and tops than did ploughing-down. Plants on plots manured in spring usually grew quicker early in the season. In 1959, with a starter dose of P and K in the seed-bed, ploughing-down was almost as effective as the spring application. In 9 trials, ploughing-down gave higher yields, but the reason for these exceptions was unknown. F. s.—A.M.H.

1249 Siwicki, S. Porównanie róznych zabiegów przy pielegnowaniu buraków cukrowych. **[Comparison of various practices in the cultivation of sugar-beet.]** *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 1, 47–103, bibl. 51, English and Russian summaries.

In experiments conducted from 1953–56 at the Experiment Stations of Chrząstowo and Pożoğ, Poland, powdered calcium cyanamide at the rate of 150 kg/ha, applied a few days before the sowing of sugar-beet, effected a reduction of subsequent weed growth of 30·3 – 47·7% and exerted no negative influence upon the beet. Some short-lived weeds proved to be especially susceptible to this treatment. Deeper digging and the removal of soil between plants while thinning and singling increased yield only under conditions of high humidity. Wollen's method of thinning and singling, compared with the usual method of thinning, resulted in a 2·4 – 33% saving of labour. Cultivation to a depth of 5 – 6 cm between beet rows proved the most satisfactory practice, but in years of high humidity cultivation alternating in depth between 12 and 2–3 cm produced an increase in yield of roots, leaves and sugar content. The reverse order of cultivation, from shallow to 12 cm deep, gave no advantage. F. Eng. s.—G.M.R.

1250 Bandeen, J. D. and others. **An investigation of the effects of various methods of herbicide application on weed control in sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1960, **11**, No. 2, 151–4, bibl. 5. [Ontario Agric. Coll., Guelph, Canada]

EPTC at 2, 4 and 6 lb/ac and endothal at 4, 6 and 8 lb/ac were applied to the surface of the soil by spraying in 30 gal water. This was done (1) immediately after sowing, (2) immediately before sowing and incorporated with a spike-tooth harrow, (3) the same incorporated with a spring-tooth cultivator, (4) the same incorporated with a double disc. All plots were harrowed and compacted after treatment. Endothal was unsatisfactory in all treatments, and EPTC was ineffective when applied to the soil surface after sowing and not incorporated. EPTC applied before sowing and incorporated gave good control of both grasses and broad-leaved weeds, with the advantage slightly in favour of the double disc and spring-tooth cultivator. At rates above 2 lb/ac, EPTC was toxic to the beet.—J.D.J.

1251 Bandeen, J. D. and others. **Further studies on the control of weeds in sugar beets with herbicides.** *J. Amer. Soc. Sug. Beet Technol.* 1960, **11**, No. 2, 160–3, bibl. 1. [Ontario Agric. Coll., Guelph, Canada]

Twelve herbicides were applied to the surface of the soil after sowing, or incorporated in the soil with a double disc before sowing, as for treatments (1) and (4) in the previous abstract. The most effective treatments were granular EPTC at 2 lb/ac and granular endothal, both incorporated into the soil in dry form. CDEC and CP 6936 (alpha-chloro-N-ethyl-N-phenylcarbamate) were the best herbicides for surface application after sowing. Monuron, diuron and GC 2603 (3-phenyl-1,1-dimethylurea trichloracetate) controlled the weeds but damaged the beet.—J.D.J.

1252 Burtch, L. M. and Carlson, C. M. **Yield comparisons from chemically and hand-weeded sugar beets under several watergrass conditions in California.** *J. Amer. Soc. Sug. Beet Technol.* 1959, **10**, No. 6, 467–77, bibl. 3. [Received April, 1960]

Various rates of dalapon applied in mid-season when beet foliage was 8–15 in. high gave some, but insufficient, control of watergrass (*Echinochloa crus-galli*) and did not increase beet yields. Uncontrolled watergrass reduced yields by 2–14 tons/ac compared with hand-hoed plots. Hand-hoeing produced the most economic control of watergrass and resulted in the highest yields in all cases. There were no varietal differences in response of sugar-beet to dalapon. F. s.—A.M.H.

1253 Sexsmith, J. J. **Chemical control of wild oats (*Avena fatua* L.) in sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1960, **11**, No. 3, 268–78, bibl. 9, illus. [Research Sta., Lethbridge, Alberta, Canada]

The following herbicides, as pre-sowing treatments, were tested singly over a period of 5 years (not all together in any 1 year) in field plots sown to Kuhn sugar-beet ; (1) IPC [propham], (2) CIPC [chlorpropham], (3) DCU, (4) TCA, (5) CDAA, (6) endothal, (7) EPTC, (8) avadex, (9) dalapon. In addition, a few post-emergence trials were conducted with TCA and dalapon. Acceptable control (85% or more) of *Avena fatua* was obtained with IPC at 6 and 8 lb/ac, EPTC at

2–8 lb/ac and avadex at 2–6 lb/ac. None of the pre-sowing treatments caused reduction in yield of the sugar-beet. The post-emergence treatments suppressed but did not kill *A. fatua* and *Setaria viridis*. Dalapon at 6 lb/ac applied post-emergence significantly reduced sugar-beet yield. —R.H.F.

1254 Dorst, H. E. **Experimental control of the beet leafhopper on sugar beets for seed.** *J. Amer. Soc. Sug. Beet Technol.* 1960, **11**, No. 1, 12–14, bibl. 8.

Experiments were made in 1956 and 1957 on the control of the leaf-hopper, *Circulifer tenellus*, vector of curly-top virus, attacking young sugar-beet plants in Utah. The best treatment was to dress the 20 lb of seed required to sow one acre with 8 oz of thimet in a 44% wettable powder with captan. This reduced the leaf-hopper population by 90% up to the 8-leaf stage, and obvious symptoms of curly top by 98%, when control plots were carrying 1·5 leafhoppers per sq. ft. Single applications of DDT spray or dust and granular formulations of malathion, thimet, or diazinon to the foliage were also effective if timed to coincide with the movement of leafhoppers to the crop.—J.D.J.

1255 Hills, O. A. and others. **Beet leafhopper control in sugar beets by seed or soil treatment.** *J. Amer. Soc. Sug. Beet Technol.* 1960, **11**, No. 1, 15–24, bibl. 3, illus.

Field and glasshouse experiments were made in 1956 and 1957, at Phoenix, Arizona, on the control of the leafhopper, *Circulifer tenellus*, vector of curly-top virus. The best treatment was to dress the 15 lb of seed (which was required to sow 1 acre) with 0·5 – 1 lb of either phorate or di-syston dust. Cage tests and plant analyses showed that both systemic insecticides tended to concentrate in the cotyledons. Good kills were obtained nevertheless, because the cotyledons persist till the 6- or 8-leaf stage (plants 10 – 12 in. tall) and the insect is an active one.—J.D.J.

1256 Allen, W. R. and others. **Insecticidal control of the sugar-beet root maggot and yield of sugar beets.** *J. econ. Ent.* 1961, **54**, 1, 178–81, bibl. 11. [Canada Dept Agric. Res. Sta., Winnipeg, Manitoba]

When heptachlor was applied in the seed furrow at 0·5 – 2·0 lb/ac with ammonium phosphate fertilizer the number of maggots (*Tetanopus myopalformis*) in soil samples taken beneath a beet was reduced by about 80%, and yield increased by up to 2·4 ton beet/acre. Yields were not increased when the fertilizer was applied as top dressing and the insecticide was placed in the furrow at 1 lb/ac, although maggot control was maintained. The increase in yield was due to an increase in beet size. Diazinon at 1 lb/ac applied in the furrow controlled the maggot but was phytotoxic.—R.H.F.

1257 Allen, W. R. and others. **Effect of insecticide fertilizer mixtures and seed treatments on emergence of sugar beet seedlings.** *J. econ. Ent.* 1961, **54**, No. 1, 181–7, bibl. 20. [Canada Dept Agric. Res. Sta., Winnipeg, Manitoba]

A slight, but not serious, reduction in stand of sugar-beet seedlings resulted from the seed-furrow application of 80 lb/ac of a mixture containing 1·25% heptachlor + 1·8 – 5% xylene (solvent) + ammonium phosphate (11 : 48 : 0). In dry soil (45% available moisture) there was no further depression of seedling emergence by the addition of the insecticide and solvent than from the fertilizer alone. The solvent velsicol AR-60 significantly depressed seedling emergence when compared with xylene. Phorate and diazinon were more phytotoxic than heptachlor or trithion but this effect was nullified when seed had been treated with captan. [See also previous abstract.]—R.H.F.

1258 Bennett, C. W. **Sugar beet yellows disease.** *Tech. Bull. 1218 Agric. Res. Serv., U.S. Dept. Agric.* 1960, pp. 63, bibl. 61, illus.

Possible control measures consist of spraying to control vectors, destroying sources of infection and selecting sowing dates to avoid infection. F. s. —C.L.S.

1259 Afanasiev, M. M. and others. **Simulated hail injury to sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1960, **11**, No. 3, 196–200, bibl. 2. [Huntley Branch Sta., Montana]

In a replicated experiment, hail damage was simulated by cutting off foliage to the extent of 25, 50, 75 or 100% at 15-day intervals from mid-June to mid-Sept. It was found that 25% defoliation had but a slight adverse effect on yield of sugar-beet/ac, that 50 or 75% defoliation reduced yields by as much as 6%, whilst 100% defoliation in June, July or Aug. caused 23–27% reduction in yield. Defoliations during Sept. had very little effect on yield.—R.H.F.

1260 Agarkov, V. A. **[New data on determining the resistance of sugar-beet roots to decay.]** [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1960, No. 4 (124), 583–7. [Agric. Inst., Kamenets-Podol'sk, Ukraine]

1261 Loomis, R. S. and Ulrich, A. **Response of sugar beets to nitrogen depletion in relation to root size.** *J. Amer. Soc. Sug. Beet Technol.* 1959, **10**, No. 6, 499–512, bibl. 17.

The responses of sugar-beets to N depletion in relation to root size were investigated outdoors at Berkeley and Davis, California, using 10-gal cans with vermiculite and nutrient solutions as a culture medium. Three root-size classifications were obtained by sowing beets on 1 March, 1 May and

1 June. All plants were watered daily with a complete nutrient solution until 15 Aug., after which one group continued to receive complete solution while another was watered with a solution without N. Plants were harvested on 15 Aug. and 15 Oct. On 15 Oct., plus-N beets, regardless of root size (sowing date), had uniform top development and sucrose concentration at each location. The minus-N plants had small (typically N-deficient) tops and lower root yields than the plus-N plants, but their sucrose concentrations were much higher and showed a striking inverse relationship to mean root size. Sucrose yields, however, were about equal for plus- and minus-N beets. Starting from a high-N status, small beets increased in sucrose concentration with the onset of N-deficiency faster than did large roots. Under plus-N conditions, the percentage of sucrose in the crowns was slightly less than in the roots. Under minus-N conditions, sucrose concentrations increased in both roots and crowns, with the largest increases observed for roots. Within each treatment (sowing date × N level) there was no evident correlation between sucrose concentration and root weight of sugar-beet indicating that such correlations when observed are largely environmental responses. F. s.—A.M.H.

1262 Garz, J. Zur Kenntnis des Phosphathaushaltes der Zuckerrübe. [**Towards an understanding of the phosphate economy of the sugar-beet.**] *Albr.-Thaer-Arch.* 1961, **5**, No. 1, 24–32, bibl. 16, Russian and English summaries. [Inst. PflErnähr. u. Bodenkunde, Martin-Luther Univ., Halle-Wittenberg, E. Germany]

In young leaves of sugar-beet there is a higher content of organic P compounds (especially nucleic acids) than of inorganic P compounds. The fully grown leaves have a great capacity for accumulating inorganic phosphates, which are available for further growth of the plant and if necessary are returned to the root for storage. With normal P-nutrition, the organic P compounds are released only when protein degeneration sets in in the aging leaves, but with severe P-deficiency there may be premature break-up of nucleic acids and yellowing of the leaf. F. Ger. s.—D.B.

1263 Willey, L. A. **Bolting in early sown sugar beet.** *Brit. Sug. Beet Rev.* 1960, **29**, No. 2, 69–70. [Nat. Inst. Agric. Bot., Cambridge]

A table shows the average percentages of bolters in the sugar-beet varieties grown in Gt Britain in 1960. Battle's E and Cambro gave the lowest numbers of early bolters but Zwaanesse III gave the lowest number of total bolters. [See also *Fld Crop Abstr.* 13 : 1257.]—E.B.O.

1264 Snyder, F. W. and Wittwer, S. H. **Some effects of gibberellin on stem elongation and flowering in sugar beets.** *J. Amer. Soc. Sug. Beet Technol.* 1959, **10**, No. 6, 553–61, bibl. 3, illus. [Michigan Agric. Exp. Sta., E. Lansing]

At an 18-hr photoperiod and a night temperature of 55°F, 3 applications of 1000 ppm. gibberellin promoted earlier flowering of both annual (SL 9460) and biennial (US 400) sugar-beets. No normal flowering occurred at a 9-hr photoperiod. Appreciable flowering was induced with gibberellin in US 400, a biennial variety of intermediate bolting tendency, when grown at a non-inductive temperature (65°F) and simultaneously exposed to an 18-hr photoperiod. Considerable stem elongation resulted from all gibberellin treatments, irrespective of photoperiod and temperature. In plants produced from vegetative cuttings that had 2 or more terminals, the gibberellin stimulus for stem elongation was not transmitted from the treated shoot to one that was not treated. Marked variations occurred in the flowering behaviour of types and varieties of sugar-beets and in plants of the same variety exposed to the same environment. F. s.—A.M.H.

1265 Donà dalle Rose, A. L'accertamento del "grado di poliploidia" del semebietole commerciale. [**The determination of the "degree of polyploidy" of commercial sugar-beet seed.**] *Publ. 71 Sta. sper. bieticolt. Rovigo* 1960, pp. 10, bibl. 2, French summary.

See also *Fld Crop Abstr.* 14 : 254.

1266 Finkner, R. E. and others. **Effects of storage on raffinose content of sugar beets. 1. Varietal changes occurring during storage. 2. Evaluation of variance components for optimum sample size determination.** *J. Amer. Soc. Sug. Beet Technol.* 1959, **10**, No. 6, 481–98, bibl. 17. [Received April, 1960]

The raffinose content of topped beets kept in a cellar at *c.* 4°C showed a significant increase during storage for as long as 9 weeks. After 3 weeks there were no significant differences in raffinose content between beets stored in a regular storage pile and those kept in the cellar. All varieties tested showed a significant increase in raffinose content during storage but the varieties kept their initial ranking. The rate of raffinose accumulation decreased as the beets remained in storage. F. s.—A.M.H.

1267 Ulrich, A. and Ohki, K. **Preparation and storage of beet pulp samples for sucrose analysis.** *J. Amer. Soc. Sug. Beet Technol.* 1960, **11**, No. 1, 68–74, bibl. 5. [Univ. California]

1268 Rowbottom, J. D. **Economics of sugar beet growing in the east of Scotland, 1958 and 1959 crops.** *Econ. Rep. 64 Edinb. Sch. Agric.* 1960, pp. 27. [Received Jan., 1961]

FODDER-BEET AND MANGELS

1269† VAN DER ZWEERDE, H. and VAN DEN BRINK, G. A. De opbrengst van voederbieten op de droge zandgronden van de Veluwe in 1959. [**The yield of fodder-beet on the dry sandy soils of the Veluwe in 1959.**] *Landb Voorl.* 1960, **17**, No. 12, 714–18.

Data are presented on the effects of the 1959 drought on yield and chemical composition of fodder-beet grown with and without irrigation on dry sandy soils in Gelderland as determined for crops harvested on 5–6 Oct., before the drought broke, and on 6 Nov. after rain. Yields of root dry matter were 50% of normal and those of tops 25% of normal. Irrigation water was in short supply, and the irrigated crop yielded as much root and tops as unirrigated crops normally do in other years ; however, the crop contained 40% more crude protein than normal. The high-dry-matter varieties Groenkraag CB, Bison and Groeningia yielded about 45 kg dry matter per are without irrigation, while the low-dry-matter varieties Barres CB, Mommersteegs Barres and Barres Ferritslev X yielded 54 kg dry matter per are. The last-named variety performed best during the drought and was always leafier than the other varieties. In damp years the high-dry-matter varieties usually yielded best. Observations on keeping quality indicated that those beets lifted before the rains deteriorated much more rapidly in storage than those lifted later. Dry-matter yields of potatoes and silage maize during the drought were 80% of those of fodder-beet, while those of cereals were only about 30% as high.—R.B.

1270 DUNNING, R. A. **Mangold fly [*Pegomyia betae*] incidence, economic importance and control.** *Pl. Path.* 1961, **10**, No. 1, 1–9, bibl. 12. [Rothamsted Fld Sta., Dunholme, Lincs]

1271 VAN DER ZWEERDE, H. Het optreden van hartrot op een proefveld met voederbieten op zandgrond. **The occurrence of heart rot (B-deficiency) in a trial field with fodder beet on sandy soil.** *Jaarb. Inst. Biol. Scheik. Onderz. LandbGew. 1960* 1960, 51–4, bibl. 5, English summary.

Borax at 10 kg/ha, i.e. 1·1 kg B/ha, was applied in 1955 during the first year of a 3-year ley to determine its effect on clover development [*Herb. Abstr.* 30 : 447]. A preceding crop of fodder-beet in 1954 had been given 315 kg Na_2O/ha as Chilean nitrate or as NaCl. When fodder-beet was again grown in 1958, the stands of beet plants per ha were 80,000, 77,000 and 86,000 where no Na, NaCl and Chilean nitrate had been applied, respectively. Where B had been applied, 13% of the beets were slightly affected by heart rot, whereas without B 65% were severely affected. Dry-matter yields without B were only 18% lower than those with B. It was calculated that 20% heart rot decreased yields by 9%, and 100% heart rot decreased yields by 24%. Heart rot had practically no effect on the keeping quality of the roots. Soil analysis in Feb. 1960 failed to reveal any differences in soil B content among the various treatments.—R.B.

1272† MEIER, W. Ergebnisse weiterer Lagerungsversuche mit Futterrüben. [**Results of further trials in the storage of fodder beet.**] *Mitt. schweiz. Landw.* 1960, **8**, No. 8, 113–21. [Eidg. Landw. Versuchsanst., Zürich-Oerlikon]

Two factors in losses of dry matter, sugar, and starch equivalent during storage of fodder-beet were studied. These were : (1) the original dry-matter content of the varieties ; and (2) the storage environment. The varieties were grouped into 3 classes according to dry-matter content : mangel (9–13%), half sugar-beet (13–16%), fodder sugar-beet (16–22%). Losses were determined half-way through storage, and the data show that the percentage loss of dry matter from mangels by mid-January was as great as from fodder sugar-beet by the end of the storage period. The optimum storage temperature and relative humidity were 2–4°C and 90%. There was an inverse relationship between the percentage of rotting during storage and the original dry-matter content.—D.B.

POTATOES

1273 WRIGHT, W. A. **The cultivation of the potato for the best results under local conditions [in Mauritius].** *Rev. agric. suc. Maurice* 1960, **39**, No. 6, 361–3.

1274 KOZLOWSKA, A. **Effects of environment on tuber production, potassium absorption, and susceptibility of potatoes to virus disease in Poland.** *Amer. Potato J.* 1960, **37**, No. 11, 366–72, bibl. 9.

Seed tubers of the 2 varieties Epoka and Ackersegen, harvested in Pomerania in 1955, were planted, without renewal, for 2 consecutive years in an extensive series of trials at sites in the lowlands of S. Poland and the Carpathian mountains at altitudes ranging from 207 to 1292 m and having mean daily temperatures during the growing season of 10·0 – 16·3°C. In the third year, tubers from all the sites were grown at Cracow in the lowlands. The first transfer resulted in a single-plant yield reduction of 44 g for Epoka and 59 g for Ackersegen for each 100 m increase in altitude above 300 m. This yield decrease was highly correlated with increase in K content of tubers. For the second transfer there was a marked increase in yield from tubers coming from sites over 400 m irrespective of soil type. The incidence of virus disease was much lower at elevations above 400 m,

and plants grown from tubers transferred from those sites to Cracow showed far less infection than seed tubers from below 400 m.—R.H.F.

1275 Blake, G. R. and others. **Soil compaction and potato growth.** *Amer. Potato J.* 1960, **37**, No. 12, 409–13, bibl. 8. [Minnesota Agric. Exp. Sta., St. Paul]

The packing treatment (passage of a tractor) increased the bulk density of the silty clay loam soil in the experimental plots, by [12·5%] and reduced the easily drained pore space from 14% to 9%. The effect of packing was to delay emergence, reduce yield and lower the specific gravity of Pontiac and Early Gem potatoes.—R.H.F.

1276 Bonde, R. and Hyland, Fay. **Effects of antibiotic and fungicidal treatments on wound periderm formation, plant emergence, and yields produced by cut seed potatoes.** *Amer. Potato J.* 1960, **37**, No. 9, 279–88, bibl. 6, illus. [Maine Agric. Exp. Sta.]

Submersion of Katahdin seed potatoes (cut lengthwise) for 5 min. in a solution of 100 ppm. agri-mycin (a proprietary formulation containing 15% streptomycin) did not alter the extent of suberization or depth of wound periderm development, but did alter the cell-wall pattern at the cut surface, as compared with no treatment. In a further series of experiments, setts were treated before and after cutting, with captan (0·2% solution) either alone or with agri-mycin as above. There was a marked increase in infection by *Penicillium* and *Fusarium* in treatments containing agri-mycin following storage for various periods up to 90 days. This, however, had no adverse effect on germination, subsequent growth or yield, as determined from a subsequent trial.—R.H.F.

1277 Timm, H. and Rappaport, L. **Sprouting, plant growth, and tuber production as affected by chemical treatment of white potato seed pieces. 3. Compatibility of gibberellic acid with chemicals used for seed treatment.** *Amer. Potato J.* 1960, **37**, No. 12, 403–8, bibl. 9. [Univ. California, Davis]

The promotion by GA of sprouting and emergence of White Rose seed potatoes was not affected by the presence of the following fungicides: formaldehyde, mercuric chloride, semesan bel, captan 75, phygon XL.—R.H.F.

1278 Timm, H. and others. **Sprouting, plant growth, and tuber production as affected by chemical treatment of white potato seed pieces. 2. Effect of temperature and time of treatment with gibberellic acid.** *Amer. Potato J.* 1960, **37**, No. 11, 357–65, bibl. 20, illus. [Dep. Veg. Crops, Univ. California, Davis]

Four varieties of potato (White Rose, Kennebec, Pontiac, and Russet Burbank) were treated, 2–6 weeks after harvest and following storage at 41°F and 77°F, with concentrations of GA ranging from 0 to 25 ppm. Sprouting was greatly stimulated by treatment at 2 weeks (individual varieties responding differently), but the effect was lost by delaying treatment to 6 weeks. Sprouting was stimulated by GA at both 41 and 77°F but the effect was more marked at 77° owing to reduced sprouting from the control treatment. The adverse effects of GA were less marked at concentrations below 5 ppm.—R.H.F.

1279 Birecki, M. and Szulc, J. Wpływ terminów sadzenia na plonowanie ziemniaków jarowizowanych. **The influence of periods of planting on yields of vernalized potatoes.** *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 1, 1–27, bibl. 7, English and Russian summaries.

In different parts of Poland seed potatoes of 3 varieties (Pierwiosnek, early; Bem, medium early; and Dar, late) were planted at five 10-day intervals from the end of April. The following are among the conclusions reached: (1) the earliest planting period is the optimum when weather during growth is normal; (2) the early variety is more sensitive to unfavourable conditions in spring than the later varieties, while the latter react strongly to delayed planting; (3) in general, planting towards the end of the 3rd week of May, or later, decreases yield irrespective of weather later on. Locally governed differences in regard to optimum planting period are noted. Cold spells in spring retard the sprouting of vernalized potatoes considerably less than that of non-vernalized. The influence of vernalization on sprouting is most evident in the early variety Pierwiosnek. As planting is delayed, differences between the growth and development of vernalized and non-vernalized potatoes decline. The influence of vernalization is connected with weather, is closely connected with the optimum period of planting, and influences the quality of the crop. Delayed planting lowers crop quality, the deterioration being greater in non-vernalized and only slight in vernalized potatoes. F. Eng. s.—G.M.R.

1280 Struchtemeyer, R. A. **Efficiency in the use of water by potatoes.** *Amer. Potato J.* 1961, **38**, No. 1, 22–4, bibl. 7. [Maine Agric. Exp. Sta., Orono]

Shortage of soil moisture in the last half of the growing season tended to reduce yields of Katahdin potatoes more than a shortage during the first half. F. s.—R.H.F.

1281 Birecki, M. and Kubicki, K. Wpływ wieloletniego jarowizowania i dokarmiania ziemniaków na wartość produkcyjna sadzeniaków. **Influence of vernalization and additional**

fertilizing over a long-term period on the productional value of seed potatoes. *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 1, 29–46, bibl. 9, English and Russian summaries.

In the localities of Chylice and Reguly, the effect was studied of vernalization, addition of supplementary fertilizers and both treatments together on the seed value of 3 potato varieties (1 early, 1 medium and 1 late). Only after 2 and 3 years' application of these measures was any change produced in the value of the potatoes for seed. Considerable differences were observed between the early and the late variety, the medium early occupying a midway position. At Chylice, the early variety showed no difference in seed-tuber value throughout the 2 and 3 years, but at Reguly, its value increased under 3 years' vernalization and vernalization + supplementary fertilizers. No change was found in the value of the medium-early variety, except that a negative influence on its yielding capacity was observed at Reguly after vernalization + supplementary fertilizers. At Reguly also, lowering of yielding capacity was seen in the late variety after 2 and 3 years' vernalization or vernalization + supplementary fertilizers. This degeneration is not virus-induced. The health of the potatoes and the starch content of the tubers were unaffected by the measures employed. F. Eng. s.—G.M.R.

1282 Odland, T. E. and Sheehan, J. E. **Response of potatoes to different amounts of nitrogen, phosphoric acid and potash when grown in continuous culture and in rotation with redtop.** *Amer. Potato J.* 1961, **38**, No. 2, 33–42, bibl. 7. [Rhode Island Exp. Sta., Kingston]

Further results are given of a series of trials begun in 1941 and reported in 1956 [*Fld Crop Abstr.* 10 : 206] in which the potato varieties Green Mountain and Katahdin were grown : (a) continuously, (b) in a 2-year rotation of potatoes/rye, 2 crops of soyabeans for green manure, rye, (c) in a 4-year rotation with redtop [*Agrostis gigantea*], each crop being taken for 2 consecutive years. The average yields in bu/ac for two 4-year periods were: potatoes continuously, 325 ; potatoes/redtop, 404. Over a 9-year period the yields were : potatoes continuously, 336 ; potatoes/soyabeans, 393. The specific gravity of the potatoes decreased with increasing quantity of NPK, remained constant under the soyabean rotation and increased significantly under the redtop rotation. It is recommended that 1500 to 1800 lb of an 8-12-12 mixture be used under the conditions reported.—R.H.F.

1283 Houghland, G. V. C. **The influence of phosphorus on the growth and physiology of the potato plant.** *Amer. Potato J.* 1960, **37**, No. 4, 127–38, bibl. 9, illus. [USDA, Beltsville, Maryland]

In a series of pot experiments (sand and nutrient solution) in which potato setts of the variety Cherokee were grown under conditions of both delayed application, and 2 levels of P, it was shown that abundant available P was required during the early phases of development for optimum growth and tuber formation.—R.H.F.

1284 Estes, G. O. and Gausman, H. W. **Some effects of sulfur-magnesium ratios on the potato plant (*Solanum tuberosum*).** *Amer. Potato J.* 1961, **38**, No. 2, 43–50, bibl. 12, illus. [Maine Agric. Exp. Sta., Orono]

The results are reported (in terms of effect on plant height, dry weight, number of tubers and their chemical composition) of the addition of S and Mg at rates equivalent to 0, 10, 20 and 30 lb /ac to 3 crops of Katahdin potatoes grown under glasshouse conditions. The uptake and leaf distribution of ^{35}S were investigated.—R.H.F.

1285 Gausman, H. W. and others. **Effect of foliar applications of chloride and sulfate on the specific gravity of white potato tubers.** *Amer. Potato J.* 1960, **37**, No. 11, 377–8, bibl. 3. [Maine Agric. Exp. Sta., Orono]

A pilot study indicated that the specific gravity of Katahdin potatoes was reduced by spraying the foliage at flowering time with solutions of sodium chloride and sodium sulphate, alone or in combination, at rates of up to 3·93 lb/ac. The influence of atmospheric sources of Cl' and SO_4'' on potato nutrition is briefly discussed.—R.H.F.

1286 Šikina, A. P. [**The effect of organo-mineral and bacterial fertilizers on yield, assimilation of carbon and tuber quality in potatoes.**] [Russian] *Izv. Akad. Nauk Kazah. SSR (Bull. Acad. Sci. Kazah SSR)* 1961, No. 1 (10), 3–14, bibl. 23.

1287 Hansen, F. Maleinhydrazid som spirehæmmende middel for kartofler. **Maleic hydrazide as a sprout-inhibiting agent for potatoes.** *Tidsskr. Planteavl* 1960, **64**, No. 3,417–48, bibl. 22, English summary.

In trials in Denmark during 1953–6, the following potato varieties were grown : at Studsgaard, Bintje (4 yr), Up to Date (3 yr), Alpha (3 yr) ; at Jyndevad, Up to Date (2 yr), Majestic (1 yr), Alpha (3 yr) ; at Tylstrup, Bintje (3 yr). The crops were sprayed with 0·25% MH in 1953–4, or with 0·5% MH in 1955–6, at 500 l/ha, on one of 4 dates (given) between flowering and lifting. Untreated control plots yielded on average 5–6 hkg tubers/ha more than plots sprayed on the first 2 dates and 2 hkg/ha more than those sprayed on the last 2 dates. MH did not affect dry-matter content, tuber size, vitamin C content or cooking quality. Spraying with MH had little effect on the rate of

tuber sprouting, it increased the number of sprouts by 50%, restrained sprout elongation and caused some abnormal sprout development. Early spraying had a more pronounced effect than later spraying. Losses in weight during storage were greater in tubers from treated than from untreated plots, and greater in clamps than in storehouses.—R.B.

1288 Sawyer, R. L. and others. **Progress report on potato vine killing.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 123–4.

Various combinations of 6 or 8 lb sodium arsenite and 0–4 gal sodium silicate per ac were applied to Katahdin potatoes in an attempt to induce normal tuber maturation after haulm killing. All treatments decreased tuber yield compared with the controls. The addition of sodium silicate to sodium arsenite slowed down the killing action and increased the specific gravity of the tubers.—A.M.H.

1289 Dummer, M. **The prospect for seed potato production in Wales.** [n.d.], pp. 23, Aberystwyth : Dep. Agric. Econ. Univ. Coll. Wales, 2s. 6d. [Received Nov., 1960]

Seed-potato production in Wales is concentrated in the counties of Brecon, Cardigan and Radnor. It is considered that the acreage of seed potatoes there can be increased : reasons for this are given.—G.L.S.

1290 Statens Forsøgsvirksomhed i Plantekultur, Denmark. Forsøg med tidlige, brokimmune kartoffelsorter 1959–60. Foreløbig meddelelse. [**Trials with early, wart-immune potato varieties 1959-60. Preliminary communication.**] *Medd. 657 Stat. Forsøgsvirk. Plantekult.* 1961, pp. 4.

Five newly introduced early potato varieties were compared with the standard wart-immune variety Primula at 1 location on clay soil and 2 on sandy soil in Denmark. The crop was planted in the first half of April in both years, and harvested in the last week of June, 2 weeks later, and again at full maturity. At the first date of lifting, Vandel Minea gave the highest yields of tubers, exceeding those of Primula by 23 hkg/ha (total yield), or by 33 hkg/ha (tubers > 30 mm diam.). Comtessa, Lembkes Planet and Corona yielded roughly the same as Primula (119–122 hkg/ha total yield), while Farfadette yielded 14 hkg less. At the second date of lifting, Vandel Minea yielded most (257 hkg/ha), followed by Farfadette, while at the final lifting Farfadette gave much the highest yields (363 hkg/ha). Data are given on susceptibility to disease and on cooking qualities, together with brief descriptions of each variety.—R.B.

1291 Furunes, J. Forsøk med tidlige potetsorter 1929–56. **Trials with early potato varieties 1929-56.** *Forskn. Fors. Landbr.* 1960, **11**, No. 4, 421–32, bibl. 11, English summary. [Statens Forsøksgard Vågønes, Norway]

Of 11 early potato varieties tested at Vågønes State Experiment Station, 67° 17′ N., 14° 24′ E., Epicure, Early Puritan, King George V and possibly Early Rose alone appeared to be suitable for the district. Epicure outyielded the other varieties at the earliest dates of lifting (about 8 Aug.), but yielded less dry matter than King George V and Early Puritan when lifted late (about 9 Sept.). Epicure was of better quality than the other 2 varieties, except for tuber shape. King George V alone was resistant to wart disease (*Synchytrium endobioticum*) but was susceptible to spraing and internal rust spot. F. Eng. s.—R.B.

1292 Rønsen, K. Sortsforsøk med poteter i fjellbygdene 1948–58. **Varietal trials with potatoes in the mountain districts 1948-58.** *Forskn. Fors. Landbr.* 1960, **11**, No. 5, 435–57, bibl. 10, English summary. [Statens Forsøksgard Løken, Norway]

The trials were conducted in various mountain valleys in S.E. Norway. Sagerud, Eigenheimer and Kerr's Pink gave high yields of good quality ware potatoes. Sagerud and Eigenheimer were almost identical in appearance, save that the latter had somewhat larger tubers. Kerr's Pink was too late a variety to be grown at very high altitudes. Saga was early and relatively high yielding. The blight-resistant variety Åspotet yielded well at the lower altitudes. Neither Saga nor Åspotet were good ware potatoes. F. Eng.s.—R.B.

1293 Varis, E. Peruna. **Potatoes.** *Tamm. Hankk. Kasvinj. Siemenjulk.* 1960, 67–85, illus., English summary. [Hankkija Co-op. Soc., Finland]

From 1955 onwards, varietal trials were conducted at the Hankkija Experiment Farm on sandy soils, which showed up the degree of drought resistance in the different varieties. Special attention was paid to varieties of ware potato. The most promising among the early potatoes were Corona and Oberarnbacher Frühe. Among the early main-crop varieties, Lori, and the starchy potato Amyla were of most interest, and of the late main-crop varieties Magna and Benedikta seem to be the most suitable. F. Eng. s.—G.M.R.

1294 Dearborn, C. H. **Performance of 127 potatoes varieties in Alaska 1951-1959.** *Bull. 29 Univ. Alaska agric. Exp. Sta.* 1960, pp. 26, illus.

The following 4 white potato varieties are recommended for commercial production in Alaska : Green Mountain (syn. Arctic Seedling or White Bliss), Kennebec, Alaska 114 and Stately.

The variety Ontario has some degree of scab [*Streptomyces scabies*] resistance. The varieties Norland (pink-skinned), Red Beauty (red-skinned), Swede (yellow-fleshed) and Eigenheimer (yellow-fleshed) are lower yielding but have a special consumer appeal.—R.H.F.

1295 Dearborn, C. H. **Alaska 114, a tough-skinned main crop potato.** *Amer. Potato J.* 1960, **37,** No. 3, 108–10.

Alaska 114 produces tubers of uniform size and shape. It has a tough skin, yields well, has good storage and culinary qualities and shows significantly less after-cooking darkening than Green Mountain. Its susceptibility to *Phytophthora infestans* is not known. F. s.—A.M.H.

1296 Young, L. C. and others. **Fundy : a new smooth, early maturing variety of potato.** *Amer. Potato J.* 1960, **37,** No. 8, 274–8. [Res. Sta., Fredericton, N.B., Canada]

An account is given of the origin, morphology, results of yield and cooking trials, and disease reactions of this new variety developed within the National Potato Breeding Programme of Canada. —R.H.F.

1297 Linares, S. P. J. and Mittelholzer, A. S. Diez años de ensayos de papa en Venezuela. [**Ten years of trials with potatoes in Venezuela.**] *Agron. trop., Maracay* 1959, **9,** No. 3, 93–104, English summary. [Received March, 1961]

The potato varieties Red Pontiac, Kennebec and Sebago yielded best at 0–1500 m alt., while Saco, Alpha and Profijt were best at 1501–2500 m alt. F. s.—E.B.O.

1298 Morken, O. and Vidme, T. Forsøk med kjemiske milder mot ugras i potetåker, 1950–56. **Trials on chemical weed control in potatoes, 1950-56.** *Forskn. Fors. Landbr.* 1960, **11,** No. 5, 459–82, bibl. 16, English summary.

In a series of trials throughout Norway, plots of potatoes which were (a) hand-weeded, (b) earthed-up only, were treated with 270 g MCPA, 130 g dinoseb, 135 g MCPA + 65 g dinoseb, or 50 kg calcium cyanamide per decare. In another series of trials, MCPA was applied at 150 g/decare at emergence or 1, 2 or 3 weeks later. In the first series of trials, where all the chemicals were applied at emergence, yields from hand-weeded plots were greatest and quality best where dinoseb or dinoseb/MCPA were applied. Calcium cyanamide significantly reduced yields, by 154 kg tubers, i.e. 44 kg dry matter/decare, compared with plots where the same quantity of herbicide had been harrowed-in 1 week before planting. Where calcium cyanamide was applied 1 week before emergence it gave the best results. On unweeded plots, all herbicides gave highly significant yield increases ; yields with dinoseb and dinoseb/MCPA were significantly greater than those with MCPA. All chemicals gave similar results against *Chenopodium album* (80-90% kill) and *Capsella bursa-pastoris*. Treatments containing dinoseb killed more than 80% of *Stellaria media, Galeopsis* spp., *Senecio vulgaris, Erysimum cheiranthoides, Thlaspi arvense, Myosotis arvensis, Matricaria inodora* and *M. matricarioides*, while calcium cyanamide gave satisfactory control of the 3 last-named weeds. Treatments containing MCPA controlled *Cirsium arvense* and *Rumex domesticus* [=*R. longifolius*] and were best against cruciferous weeds. MCPA applied later than crop emergence reduced tuber yields on hand-weeded plots but not where weeds were present. MCPA, dinoseb, dinoseb/MCPA and calcium cyanamide reduced hand-weeding time by 40, 45, 48 and 44%, respectively. F. Eng. s. —R.B.

1299 Trevett, M. F. and others. **Control of annual weeds in potatoes.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14,** 207–13. [Dep. Agron., Univ. Maine, Orono]

The effectiveness of 10 herbicides for control of annual broad-leaved weeds and annual grasses in potatoes was tested. Dinoseb (3 lb/ac) + dalapon (2·22 lb/ac) applied at emergence gave significantly higher yields than all other treatments, except applications at planting of 6 or 8 lb DAC-893 [dimethyl 2, 3, 5, 6-tetrachloroterephthalate], or 2 or 4 lb trietazine, which yielded slightly less. Size of plants was reduced at the highest rate of trietazine. Tuber yield was related to the efficiency of control of broad-leaved weeds, since these were more prevalent than grasses in the field used. DAC-893 and trietazine gave a longer period of residual weed control than the dinoseb/dalapon mixture.—A.M.H.

1300 Bell, R. S. and Larssen, E. **Pre-emergent and post-hilling weed control tests with Katahdin potatoes, 1958-59.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14,** 201–6, bibl. 15. [Rhode Island Agric. Exp. Sta.]

In tests of various chemicals for pre-emergence weed control in potatoes, dinoseb alone, or accompanied by dalapon, gave satisfactory weed control without depression of potato yields. Three tractor cultivations produced high yields of potatoes and excellent control of annual weeds. Atrazine, simazin and trietazine also satisfactorily suppressed annual weeds. In post-hilling tests, falone [tris-(2,4-dichlorophenoxyethyl phosphite)] and trietazine gave good control of grassy weeds with little or no depression of yields. F. s.—A.M.H.

1301 Sawyer, R. L. and others. **Lay-by weed control in potatoes.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14,** 129–30.

Falone and alanap 10 G at 4 lb/ac, applied after late cultivation, gave good commercial control of weeds in potato fields late in the season. Application of eptam in June, just before late cultivation, gave better grass control than earlier applications and 4 lb/ac gave better results than 2 lb/ac at each time of application. Amoben [amino 2,5-dichlorobenzoic acid] was promising for late grass control.—A.M.H.

1302 Isleib, D. R. **Quackgrass control in potato production.** *Weeds* 1960, **8**, No. 4, 631–5, bibl. 4. [Michigan Agric. Exp. Sta., East Lansing]

The experiments were conducted for 4 years, 1955–8, on a dense *Agropyron repens* turf normally cut for hay. The turf was sprayed with herbicide in late April or May, broken up, and planted with potatoes after an interval of 9–20 days. In the first year dalapon, TCA and MH were used. MH was discarded after one year, as it did not control *A. repens*, and TCA after 2 yr, because it did more harm to the potatoes than did dalapon. *A. repens* was controlled effectively by dalapon at 10 lb/ac, and the yield of potatoes was better than after mechanical cleaning. N fertilizers did not control *A. repens* but may have contributed towards higher potato yields. Control of *A. repens* by herbicides was greatly assisted by liberal cultivation between spraying and planting, and after planting.—J.D.J.

1303 Sawyer, R. L. and others. **Eptam for nutgrass control in potatoes.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 11–12.

Eptam at 4 or 6 lb/ac gave commercial control of nutgrass. The results indicated that both early application and good incorporation with the soil were important. F. s.—A.M.H.

1304 Department of Agriculture, Canada. **Field crops. Potatoes.** *Rep. Minist. Agric. Canad. 1958-9* 1959, 31–2, 96, 101.

Potato wart [*Synchytrium endobioticum*] was almost completely controlled, and yields were increased by applying mylone at 400 lb/ac to heavily infested soil. Control was less good with 300 and 150 lb/ac. Vancide 51, mercurous chloride and pentachloronitrobenzene gave some control, but were less effective than mylone. Of 19 varieties tested for wart resistance only Autigo, Fontana, Fortuna and Urgenta were not infected. Fram, Sebago and Ultimus showed high resistance to wart development. Symptoms of stem-streak due to Mn toxicity could be prevented by application of lime [rate not stated]. There were varietal differences in Mn tolerance. In areas around Ste. Anne de la Pocatiere, soils on which potato vines showed symptoms of Mn toxicity had an average pH of 4·7. The pH of soil sustaining healthy plants was 5·4. In New Brunswick, the systemic insecticides di-syston and thimet applied to potato seed pieces, and granular di-syston applied to the soil around the seed pieces at planting, gave excellent control of the 4 common species of aphid on potato throughout the season. Granular di-syston had no harmful effect on yield, but the seed-piece treatments reduced emergence and yield significantly. The new potato varieties Avon and Fundy are briefly described. Avon is superior in yielding ability to Katahdin and excellent in cooking quality. Fundy is an early variety with yield equal to that of Katahdin and with smooth, attractive tubers of excellent cooking quality.—A.M.H.

1305 West of Scotland Agricultural College. [**Potatoes. Disease control.**] *Rep. W. Scot. agric. Coll. 1959-60* 1960, 52.

Stem rot (*Rhizoctonia*) in first-early Epicures was effectively controlled by the application [details not stated] of Hg dust at 2·5 lb/ac. Promising methods for control of the potato-root eelworm (*Heterodera rostochiensis*) include cyst parasitism, use of fertilizers, and root exudation of marigold (*Tagetes minuta*).—R.H.F.

1306 Boock, O. J. and others. Emprêgo do isômero gama do BHC, sob forma de fumaça, no combate ao "piolho branco" da batatinha. [**Control of the mealy bug on potatoes by fumigation with the γ-isomer of BHC.**] *Biológico, S. Paulo* 1960, **26**, No. 12, 235–8, bibl. 5, English summary. [Inst. Agron., Campinas, Brazil]

The mealy bug (*Pseudococcus maritimus*) is a common pest of potatoes in Brazil, where it occurs mainly on the sprouts of stored tubers. Excellent control of this pest was obtained by fumigating the tubers with gammexane 22 (γ-isomer of BHC). This preparation was used at a rate of 3 pastils (about 15 g each) per m^3 for 1 hr, and the treatment was repeated 10–15 days later. Treated tubers should be used for planting only.—E.B.O.

1307 Lichtenstein, E. P. **Insecticidal residues in various crops grown in soils treated with abnormal rates of aldrin and heptachlor.** *J. agric. fd Chem.* 1960, **8**, No. 6, 448–51. [Univ. Wisconsin, Madison]

A number of crops was grown in a silty loam soil that had been treated with aldrin at 5 lb and heptachlor at 25 lb per acre to a depth of 5 in. It was concluded that for potatoes and lucerne, accumulation of residues of these insecticides in plant tissues would be negligible at normal rates of application.—R.H.F.

1308 Sawyer, R. L. and Collin, G. H. **Black spot of potatoes.** *Amer. Potato J.* 1960, **37**,

No. 4, 115–26, bibl. 15, illus. [Cornell Univ., Ithaca, New York]

The development of symptoms of black spot (described in this report as a sub-surface discolouration resulting from bruising) was found to be inversely related to the degree of hardness of the tuber (as measured by a durometer), and, within a given variety, directly related to the higher values of its specific gravity. This in turn is inversely related to the moisture content of the tuber and it is suggested that varietal resistance to black spot is based on the ability of the epidermis to minimise moisture loss.—R.H.F.

1309 Cotter, D. J. and Sawyer, R. L. **The effect of gamma irradiation on the incidence of black spot, and ascorbic acid, glutathione and tyrosinase content of potato tubers.** *Amer. Potato J.* 1961, **38**, No. 2, 58–65, bibl. 19. [Brookhaven National Laboratory, Upton, New York]

Research over a 3-year period demonstrated that gamma irradiation of potatoes resulted in increased black spot (a physiological disorder). Specific dosages necessary to initiate the increase could not be given because of yearly and varietal variations. Irradiation decreased ascorbic-acid content, increased glutathione content and modified the tyrosinase content of the dry matter. No specific cause and effect relationship could be demonstrated between black spot incidence and the content of ascorbic acid, glutathione or tyrosinase. High levels of ascorbic acid in the Green Mountain variety resulted in natural resistance to irradiation as measured by irradiation-induced increases of black spot. F. s.—R.H.F.

1310 Mondy, Nell I. and Klein, Barbara P. **The interrelationships of potato discoloration, polyphenol oxidase activity, and nitrogen content of potatoes.** *Amer. Potato J.* 1961, **38**, No. 1, 14–21, bibl. 17. [N.Y. State Coll. Home Econ. ; and State Agric. Exp. Sta., Cornell Univ., Ithaca, N.Y.]

Two varieties of potatoes, Ontario, which is susceptible to black spot, and Pontiac, which exhibits little black spot, were grown in 1958. The potatoes were harvested 18 weeks after planting, and were examined immediately and after 1, 2, 3, 4, 5 and 6 months of storage at 40°F. The tendency of the tuber to discolour was found to be correlated significantly with the loss in activity of polyphenol oxidase. The variety Ontario had a higher activity than Pontiac. Total N content increased, but non-protein N decreased with storage. F. s.—R.H.F.

1311 Birth, G. S. **A nondestructive technique for detecting internal discolorations in potatoes.** *Amer. Potato J.* 1960, **37**, No. 2, 53–60, bibl. 4, illus. [Agric. Marketing Serv., U.S.D.A., Beltsville, Md]

A technique for detecting internal discoloration in potatoes by light transmission is described. F. s.—A.M.H.

1312 Kallio, A. **Effect of fertility level on the incidence of hollow heart.** *Amer. Potato J.* 1960, **37**, No. 10, 338–43, bibl. 14. [Agricultural Exp. Sta., College, Alaska]

A factorial experiment was conducted to determine the effect of varying soil levels of N, P and K on the incidence of the physiological disease hollow heart in a susceptible variety of potato (Alaska 114). Results from the 1959 season's work indicated that : the level of P had no effect ; increasing amounts of N from 60 to 180 lb/ac increased the disease incidence from 50 to 73% ; increasing P from 120 to 360 lb/ac reduced incidence from 77% to 42%.—R.H.F.

1313 Lippert, L. F. **Physiological and anatomical characteristics of spindling-sprouted potato tubers.** *Amer. Potato J.* 1960, **37**, No. 10, 313–24, bibl. 19, illus. [Univ. California, Davis]

1314 Lugt, C. **Second-growth phenomena [in potatoes].** *Europ. Potato J.*, 1960, **3**, No. 4, 307–24, bibl. 7, illus.

In samples with second-growth symptoms a distinct relationship, specific for variety, has been found between the specific gravity of the individual tubers and their degree of glassiness. The term " Specific Gravity Characteristic " is proposed for the curve indicating the distribution of the specific gravity of the individual tubers of a sample. This S.G.C. has been very useful in second-growth investigations. The development of glassy tubers in crops suffering from second-growth was found to begin at the moment the foliage died. The main cause of glassiness is probably a vigorous growth of secondary tubers, subsequent to the death of the foliage. F. s.—A.G.G.H.

1315 Yamaguchi, M. and others. **Effects of color and intensity of fluorescent lights and application of chemicals and waxes on chlorophyll development of White Rose potatoes [tubers].** *Amer. Potato J.* 1960, **37**, No. 7, 229–36, bibl. 4.

1316 Bodlaender, K. B. A. De invloed van de temperatuur op de ontwikkeling van de aardappel. **The influence of temperature on the development of potatoes.** *Jaarb. Inst. Biol. Scheik. Onderz. LandbGew. 1960* 1960, 69–83, bibl. 8, illus., English summary.

Trials were carried out with the late potato var. Gineke grown in boxes in air-conditioned

glasshouses. Stem elongation increased with increasing temperature until an optimum average 24-hr temperature of 18–20°C was reached. The influence of day and night temperature on stem elongation was similar. Stem elongation was more rapid and the final stem length was greater at higher than at lower temperatures. No increase in stem length was observed at temperatures below 7–8°C. Leaves and leaflets were usually larger at lower than at higher temperatures. Leaves were dark green under high day temperatures and/or low night temperatures. Leaves died earlier at higher night temperatures than at lower night temperatures, but the formation of new leaves occurred over a longer period and the eventual number of leaves was greater. Stem weight and leaf weight were optimum at different average 24-hr temperatures, 18–20 and 12–14°C, respectively. While stem weight was influenced similarly by day and night temperature, leaf weight was increased by increasing the day temperature from 12 to 18°C, but was decreased by similarly raising the night temperature. The leaf/stem ratio decreased with rising night temperature. In one trial, planted in March 1958, abundant flowering occurred at 18°C night temperature, while at 12°C night temperature, buds alone were formed. Tuber weight was optimal at an average temperature of 12°C in winter (at low light intensity) and at 17–18°C in summer. Day temperatures of 18–24°C and night temperatures of 6–12°C were favourable for tuber growth. The number of tubers produced decreased with increasing night temperature. F. Eng. s. —R.B.

1317 Wittenrood, H. G. Invloed van ent en onderstam op de ontwikkeling van de aardappelplant. **Influence of scion and stock on the development of the potato plant.** *Jaarb. Inst. Biol. Scheik. Onderz. LandbGew. 1960* 1960, 109–22, bibl. 9, English summary.

The early potato variety Doré and the late variety Populair were grafted together in all combinations. Early scions induced earlier tuber formation than late ones. Cutting the tops from stocks of the early varieties before grafting induced tuber formation in these stocks. Of the normally observed 3 phases [production of leaves, stems and roots ; tuber production ; senescence], only the second phase occurred in plants with early scions ; with late stock and late scion, all 3 phases were present ; with early stock and late scion, there was an additional rudimentary tuber-forming phase at the time of grafting. During each single phase, growth rate increased steadily, but fell to a low level before the onset of the next phase. F. Eng. s. —R.B.

1318 Spicer, Pauline B. and Dionne, L. A. **Use of gibberellin to hasten germination of *Solanum* seed.** *Nature, Lond.* 1961, **189**, No. 4761, 327–8, bibl. 7. [Res. Sta. Canada Dep. Agric., Fredericton, New Brunswick]

True seed of the potato (*S. tuberosum*) frequently has delayed germination, and this also applies to most other tuber-bearing *Solanum* species, in which it is usual for seed to remain dormant from 1–3 months or longer. In preliminary tests, GA concentrations of up to 100 ppm. had little effect on breaking dormancy of recently harvested *Solanum* seed, but germination was stimulated by concentrations of 1000–4000 ppm. Although prolonged exposure of the seeds to 1000 ppm. concentration increased percentage germination appreciably, treatment with 2000 ppm. for 24 hr gave optimum germination. The 4000 ppm. concentration was no more effective than 2000 ppm. At the optimum concentration the majority of treated seed had germinated within 15 days. The GA treatment accelerated germination in seeds which had little dormancy and in seeds approaching the end of their dormant period. Plants were grown to maturity from the GA-treated seeds, and in all cases growth was normal.—M.H.

1319 May, A. W. S. **DDT for the protection of stored potatoes.** *Qd. J. agric. Sci.* 1959, **16**, No. 4, 329–53, bibl. 15, illus.

In Queensland there is a risk of damage by the potato tuber moth, *Gnorimoschema operculella*, either because infested tubers have been inadvertently bagged in the field, or because reinfestation has occurred during storage. In a series of experiments covering 3 successive seasons, DDT, derris and pyrethrum-piperonyl butoxide as dusts and DDT-impregnated cornsacks and sugar-bags gave adequate protection when the initial infestation was less than 4%. Infestations from 8 to 35% were arrested satisfactorily by DDT dusts (0·5 – 2%) and by containers treated in DDT emulsions (0·5 – 2·5%). Pieces of sacking or paper treated with DDT and placed among the tubers did not give conclusive results. For field use 2% DDT dust at 0·5 lb per bag and containers impregnated with 2% DDT emulsion are recommended. Lightweight hessian sugar-bags are satisfactory as an alternative to cornsacks, but 5-layered paper bags are unsuitable. DDT residues on tubers persist throughout storage, but are reduced to safe limits by subsequent handling and preparation for the table.—J.D.J.

1320 Maclachlad, D. S. **Disinfectants and potato ring rot control.** *Amer. Potato J.* 1960, No. 10, **37**, 325–37, bibl. 10, illus. [Central Exp. Farm, Ottawa]

Twenty-four disinfectants and antibiotics were tested for the control of *Corynebacterium sepedonicum* causing ring rot, and were applied at the

various sources of possible infection of seed potatoes, e.g. storage bins, sacks, cutting knives and within the tuber itself. Mercuric chloride (in 0·2% solution) and semesan bel (in 2·5% solution) were superior as instantaneous disinfectants of the cutting knife, whilst quaternary ammonium compounds were very efficient for storage surfaces. F. s.—R.H.F.

1321 Yamaguchi, M. and others. **Nutrient composition of White Rose potatoes during growth and after storage.** *Amer. Potato J.* 1960, **37**, No. 2, 73–6, bibl. 8. [Univ. California, Davis]

The effect of degree of maturity at harvesting and time and temperature of storage on the content of total sugars, starch, protein, Ca, Fe, P, ascorbic acid, thiamine, riboflavin and niacin in White Rose potatoes was studied. As tubers approached maturity in the field, sugar and ascorbic acid decreased and other nutrients increased. The main change in storage was a loss of ascorbic acid.—A.M.H.

1322 Molotkovskiĭ, G. H. and Gamula, M. I. **Dynamics of ascorbic acid in potato tubers during storage in connection with the polarity phenomenon.** [Ukrainian] *Ukr. bot. Ž., Kiev* (*Ukrainian Bot. J.*) 1960, **17**, No. 6, 28–38, bibl. 23, English and Russian summaries.

1323 Lyman, Shirley and Mackay, Andrea. **Effect of specific gravity, storage, and conditioning on potato chip color.** *Amer. Potato J.* 1961, **38**, No. 2, 51–7, bibl. 22. [Agric. Exp. Sta., Oregon State Coll., Corvallis]

In a series of cooking trials following the same storage and conditioning treatment, it was shown that, with the variety Russet Burbank, a lighter colour was associated with tubers of 1.100 sp. gr. than with those of 1.080 sp. gr.—R.H.F.

1324 Hyde, R. B. and Shewfelt, A. L. **Measurement of chipping qualities in Manitoba-grown potatoes.** *Canad. J. Pl. Sci.* 1960, **40**, No. 4, 607–10, bibl. 11. [Canada Dep. Agric., Morden, Manitoba]

Of 10 potato varieties from 3 major producing areas of Manitoba, the varieties Cherokee, Irish Cobbler, Norland and Netted Gem [Russet Burbank] each yielded tubers producing high quality potato crisps in at least one producing area. Variations in crisp-making quality occurred between localities. Specific gravity and content of reducing sugars were reliable indices of crisping quality. A simplified method for measuring the colour of potato crisps is described. F. s.—R.B.

1325 Barrios, E. P. **Some factors influencing the culinary quality of southern and northern grown Irish potatoes.** *Diss. Abstr.* 1960, **21**, No. 3, 436. [Louisiana State Univ., Baton Rouge]

1326 Ministry of Agriculture, Fisheries and Food. **Management of ware potato stores.** *Adv. Leafl. 488 Min. Agric., Fish., Fd* 1960, pp. 6, London : HMSO.

A concise account is given of the bulk storage management of potatoes in buildings.—C.L.S.

1327 MacFarland, C. S. Jr. [Ed.] **American potato yearbook 1961.** 1961, pp. 80, bibl. 287, illus., 6 maps, 15× 30 cm, Westfield, New Jersey : C. Stedman Macfarland, $2.

This issue includes maps of the principal production areas by seasons in the USA, statistics of Irish-potato production in the USA from 1919–60 and in Canada for 1960, a list of associations in Canada and the USA engaged in the improvement of the crop and an up-to-date list of references to work on potato research and cultivation published in Canada and the USA.—R.H.F.

SWEET-POTATOES

1328 Kattan, A. A. and Bryan, B. B. **On newly leveled land irrigation and twin spacing improved yield and grade of sweet potatoes.** *Ark. Fm Res.* 1960, **9**, No. 6, 8, illus.

The results are reported, in terms of yield and grades, of a field trial with the sweet-potato varieties Allgold and Copperskin Goldrush in which 1·5 in. irrigation water was given every 7, 10 and 14 days, compared with no irrigation, and the following intra-row spacings used : single setts at 6, 12 and 18 in. and double setts at 12 and 18 in. It was found that the maximum total yields and those of the fresh market and canning grades were obtained from the double 12-in. spacing using 1·5 in. of supplemental irrigation every 10 days.—R.H.F.

1329 Kattan, A. A. and Horton, B. D. **Effect of irrigation and spacing on yield and grade of sweet potatoes.** *Ark. Fm Res.* 1960, **9**, No. 2, 9, illus.

Tabulated results from a trial incorporating 5 varieties at 3 spacings indicate that an irrigation regime allowing 1·5 in. water every 10 days is beneficial only when a spacing of up to 12 in. is used.—R.H.F.

1330 Bradley, G. A. and Mayes, R. L. **Sweet potatoes for the northeast delta.** *Ark. Fm Res.* 1959, **8**, No. 6, 5.

In variety trials of sweet-potatoes in N.E. Arkansas, Allgold was the highest yielding. Copperskin Goldrush gave lower total yields, but had a

higher percentage of tubers of marketable size. Inadequate drainage was the main factor causing low yields.—A.M.H.

1331 Pope, D. T. and others. **Disease resistant new sweet potato variety.** *Res. and Fmg N.C.* 1960, **18**, No. 3, 7, illus. [North Carolina Agric. Exp. Sta.]

The variety Nugget is described. It carries resistance to internal cork formation [a symptom of virus infection] and tolerance to *Fusarium* wilt. —R.H.F.

1332 Kantack, E. J. and others. **Incidence of field spread of internal cork of sweet potato in insecticide-treated plots.** *J. econ. Ent.* 1961, **54**, No. 1, 125–7, bibl. 9. [Louisiana State University, Baton Rouge]

Sweet-potato plants originally free from internal cork were treated with insecticides during 1955–9 in Louisiana to reduce spread of internal cork by controlling the vector, *Aphis gossypii*. The spread of disease during the season from adjacent cork-affected sources was proportional to vector activity. Reduction of the disease ranged from 0% to 50%. F. s.—R.H.F.

1333 Greig, J. K. **Cationic and salinity studies with the sweet potato.** *Diss. Abstr.* 1960, **21**, No. 3, 410. [Kansas State Univ., Manhattan]

YAMS

1334 Swinburne, Kate. **Summary of information on yam storage.** 1959, pp. 6, bibl. 18. [Lodged in the Tropical Liaison Dept, Pest Infestation Lab., Slough]

JERUSALEM ARTICHOKE

1335 Hogetsu, K. and others. **Growth analytical studies on the artificial communities of *Helianthus tuberosus* with different densities.** *Jap. J. Bot.* 1960, **17**, No. 2, 278–305, bibl. 23. [Fac. Sci., Tokyo Metropolitan Univ., Japan]

Plant height, leaf area, dry weight of entire plant and of each organ of Jerusalem artichoke plants, growing at spacings of 10, 20, 30 and 100 cm were determined at early and later stages of growth. At early growth stages, these properties did not change significantly under different stand densities, but at later stages, growth rate was slower as plant density increased. The denser the stand, the earlier were the maxima of the above elements of growth reached. Shading was the environmental factor chiefly responsible for this. F. s.—D.B.

XANTHOSOMA

1336 Gooding, H. J. and Campbell, J. S. **Preliminary trials of West Indian *Xanthosoma* cultivars.** *Trop. Agric., Trin.* 1961, **38**, No. 2, 145–52, bibl. 12, illus. [Imperial Coll. Trop. Agric., Trinidad]

The yields, storage, mechanization and eating qualities of 7 *Xanthosoma* clones are described. Considerable variation is shown to exist between the clones except for the 2 with the best overall qualities, namely 22/57 and 12/56 which are probably identical. Yields of over 13 tons of marketable tubers per acre were obtained from these 2 clones and the weight loss during 14 weeks' storage under normal local temperatures and humidities did not exceed 13%. Optimum eating quality was maintained for 9 weeks under these conditions and for more than 18 weeks when stored at 45°F and about 80% relative humidity. Mechanical harvesting appears possible on flat lands. F. s.—R.H.F.

GENERAL

1337 Varis, E. Juurikasvit. **Root crops.** *Tamm. Hankk. Kasvinj. Siemenjulk.* 1960, 85–95, illus., English summary. [Hankkija Co-op. Soc., Finland]

Three-year varietal trials of root crops were designed to provide guidance on the importation of seed. The following were found to be the best varieties. Mangels : Pajbjerg's Ideal P, Svalöf Barres halvlång [medium-length], and Weibull's Aring Barres. Fodder sugar-beet : Daehnfeldt's Gul Daeno XI and DLF'S Rød Øtofte XI, Svalöf Nova II and Pajbjerg's Korsroe P being their equals in yield of dry matter. Swedes : the best Danish varieties are very similar. Turnips : Svalöf tetraploid Sirius. Some Danish Östersundom varieties were found to be superior to Weibull's Östersundom, which was used as the standard. F. Eng. s.—G.M.R.

FIBRE CROPS

COTTON

See also Abs. 1479.

1338 Simpson, D. M. **Report to the Government of Indonesia on cotton improvement.** *Rep. 1139 FAO/ETAP* 1959, pp. 27, bibl. 12. [Received Feb., 1961]

1339 Ansari, M. A. A. **Possibilities of introduction and extension of cotton crop in Azad Kashmir.** *Pakistan Cotts* 1960, **5**, No. 1, 27–38, illus. [Pakistan Centr. Cott. Cttee]

This report of a survey undertaken in Sept.

1959 for the Pakistan Central Cotton Committee gives an account of soils, climate, cotton-production areas, agricultural practices, fibre quality and the prospects for extension of cotton cultivation. Recommendations are made.—D.B.

1340 Muhamedžanov, M. V. [**Methods for obtaining an abundant and early-ripening harvest of cotton.**] [Russian] *Hlopkovodstvo* (*Cott. Prod.*) 1961, **11**, No. 3, 21–30, illus. [Uzbek SSR]

1341 Lawes, D. A. **The factors limiting cotton yield at Samaru.** *News Lett. Minist. Agric. N. Reg. Nigeria* 1961, No. 29, 6–10.

Within the existing climatic limitations of the area it is suggested that the controllable factors limiting yield are : (1) level of soil fertility ; (2) adequacy of soil moisture (as affected by soil management and sowing date) ; (3) adequacy of soil aeration ; (4) level of insect-pest infestation. The climatic potential yield is given as 2000 lb seed cotton/ac. Tabulated data from 18 experiments in which the above items varied support the hypothesis.—R.H.F.

1342 Sokolov, F. A. [**Soaking seed of cotton. (Review of published work and conclusions.**)] *Hlopkovodstvo* (*Cott. Prod.*) 1961, **11**, No. 3, 41–6. [no bibliography cited]

1343 Orunov, S. [**Experiment on sowing dry and soaked cotton seeds.**] [Russian] *Hlopkovodstvo* (*Cott. Prod.*) 1961, **11**, No. 3, 36–41. [Taškent Agric. Inst.]

1344 Seidov, G. A. and Zaĭcev, V. S. [**Results of first experiments on sowing cotton in widely spaced rows.**] [Russian] *Hlopkovodstvo* (*Cott. Prod.*) 1961, **11**, No. 4, 61–3. [Azerbaĭdžan Sci. Res. Inst. Cott. Prod.]

1345 Walton, P. D. [**Cotton-spacing trials with and without spraying at Serere.**] *Progr. Reps Exp. Stas Cott. Gr. Corp. Uganda 1959-60* 1960, 40–2.

In a range of spacings from 3 × 2 to 1 × 0·5 ft the denser populations gave the best yields when the cotton was sprayed with an insecticide, so that the adoption of spraying might call for a revision of sowing practice. Close spacing reduced the tensile strength of the fibre, and spraying reduced staple length and micronaire value, but in each case the effect was small.—J.D.J.

1346 Briggs, R. E. and others. **Cotton production under irrigation.** *Res. Progr. Ariz. agric. Exp. Sta.* 1958, 30–1. [Received Feb., 1960]

After 3 years' testing, the " skip-row " method of sowing continued to show higher yields than " solid " sowing. In 1958, Acala 44 and Acala 44-WR yielded most at 3-in. plant-spacing while 124–68 yielded best at 10-in. spacing. In a regional Acala variety test, varieties from Arizona and California generally yielded better than those from New Mexico and W. Texas. Lint yield of Acala 44-WR was significantly higher than that of A-44 in an Acala upland variety test at Marana, where *Verticillium* wilt was severe. At 3 other locations there were no significant yield differences. Tests showed that various rainbelt varieties may yield as much as Acala varieties, but their fibre qualities were less satisfactory.—A.M.H.

1347 Wahhab, A. and Ahmad, R. **Manuring of cotton in West Pakistan. 5. Effect of nitrogen, phosphorus, and potassium, alone and in combination, on the yield of seed cotton.** *Emp. J. exp. Agric.* 1961, **29**, No. 113, 73–8, bibl. 8. [Agric. Coll. Res. Inst., Lyallpur, W. Pakistan]

In trials in 5 localities in W. Pakistan, N (at 50 lb/ac), P and K were applied to cotton, separately or in combination. The responses of cotton varied because of differences in varieties and soils. The treatments which resulted generally in the highest yields at Lyallpur, Wazirkot, Montgomery and Khanewal were NP, NPK, NP and P, respectively. Results from Multan were inconclusive. These results showed a general need of cotton for P, but the use of P fertilizers was uneconomical. F. s.—E.B.O.

1348 Stromberg, L. K. **Need for potassium fertilizer on cotton determined by leaf and soil analyses.** *Calif. Agric.* 1960, **14**, No. 4, 4–5, illus.

K-deficiency symptoms of cotton in the San Joaquin Valley, California, are described. Minimum soil- and petiole-levels of K are suggested.—R.H.F.

1349 Mello, F. A. F. de. Contribuição ao estudo da aplicação do método da diagnose foliar ao algodoeiro (*Gossypium hirsutum* L., var. I.A.C. 817). 2. [**Contribution to the study of applying the method of foliar diagnosis to cotton (*G. hirsutum* var. I.A.C. 817). 2.**] *An. Esc. Agric., Queiroz* 1959, **16**, 123–33, bibl. 13, English summary. [Received May, 1961]

In a plot trial with cotton, samples of leaves, which had recently matured, were collected from the stem and from fruit-bearing branches in the middle third of the plant, at the beginning of flowering. The petioles, detached from the leaves, were dried and analysed for K content. Yield data showed a marked response to K manuring, while N and P had no effect. There was a good correlation between the K content of the petioles and the yield of seed cotton, the petioles from fruit-

bearing branches and from the stem being good indicators of the K status of the plants. It was calculated that the highest yield of seed-cotton, equivalent to 1562 kg/ha, was obtained by applying 128 kg K_2O/ha, which corresponded to 1·93% K in petioles from fruit-bearing branches and 1·85% K in petioles from the stem. [See also next abstract.]—E.B.O.

1350 Mello, F. A. F. de. Contribución al estudio de la aplicación del método de diagnosis foliar al algodonero (*Gossypium hirsutum* L., var. I.A.C. 817). [**A contribution to the study of the foliar diagnosis method applied to cotton (*G. hirsutum* var. I.A.C. 817).**] *An. Edafol. Agrobiol.* 1960, **19**, No. 5, 285–94, bibl. 28, English summary. [Esc. Sup. Agric. L. de Queiroz, São Paulo, Brazil]

An account is given of an NPK factorial trial with cotton plants grown in pots in a glasshouse. The leaves analysed were taken from the stem and from fruiting branches arising from the middle of the stem ; they were collected at the beginning of flowering and when the first bolls appeared. The main conclusion was that leaves from the fruiting branches are suitable for diagnosing the N requirement of the cotton plant. [See also previous abstract.] F. s.—E.B.O.

1351 Hardy, G. W. and Garrett, J. D. **Nitrogen fertilization of cotton on southwest Arkansas Blackland soils.** *Ark. Fm Res.* 1960, **9**, No. 2, 8.

Nitrogen, at a total rate of 60 and 120 lb/ac, was applied to cotton in one or more split dressings as follows : (a) pre-sowing sub-soil placement ; (b) side dressing at thinning ; (c) side dressing at first flowering ; (d) side dressing 2 weeks after (c). No advantage was obtained from 3 or 4 split dressings or from pre-sowing applications alone, but early to mid-season dressings (b and c), in 1 or 2 applications gave significant increases in yield of seed cotton.—R.H.F.

1352 Lemaeva, A. M. [**The influence of mineral fertilizers on the photosynthetic productivity in the cotton plant.**] [Russian] *Izv. Akad. Nauk Turkmen. SSR (Bull. Acad. Sci. Turkmenian SSR)* 1960, No. 5, 11–18, bibl. 29. [Bot. Inst., Acad. Sci. Turkmen SSR]

The boll-formation phase is the most sensitive to the effect of fertilizers. At this phase there is a close connexion between photosynthetic productivity, leaf area and yields. P applied after basic N at all developmental phases raises the productivity of photosynthesis, increases the number of fruits, and facilitates the accumulation of saccharose. Large quantities of K retard the growth of the leaves and bolls, in addition to lowering photosynthetic productivity. Supplementary doses of N fertilizers retard the process of aging, increase the leaf area, promote the accumulation of K in cotton leaves and, to some extent, lower that of P. F. Russ. s.—M.H.

1353 Veliev, I. M. and Abdullaev, G. Ja. [**Effect of low temperature in raising the cold resistance and ripening rate of cotton.**] [Russian] *Hlopkovodstvo (Cott. Prod.)* 1961, **11**, No. 4, 31 and 34–8. [Azerbaĭdzan Sci. Res. Inst. Cott. Prod.]

1354 Bažanova, A. P. [**Collection of seed within the limits of one bush of the cotton plant (*Gossypium barbadense*) and its significance for increasing yields.**] [Russian] *Izv. Akad. Nauk Turkmen. SSR (Bull. Acad. Sci. Turkmenian SSR)* 1960, No. 5, 19–25, bibl. 21. [Bot. Inst., Acad. Sci. Turkmenian SSR]

Observations have shown that for improved germination and yields of the fine-stapled cotton varieties, the seed should be collected only from sound bolls in the central part of the bush, i.e. from the 1st and 2nd bolls of the 2nd–10th sympodia. For the fine-stapled varieties 5476I and 2I3 in the Maryisk Province, collection of such seed should be completed by the end of Sept. F. Russ.s.—M.H.

1355 Christidis, B. G. **Regional cotton tests. Results of 1958.** [Greek] 1960, pp. 68, English summary, Sindos, Greece : Cotton Research Institute.

The results of varietal tests in Greece in 1958 are given. The early varieties 10E and XD, as well as the late ones ΓD, Coker and Empire gave the greatest financial return. F. Eng. s.—C.L.S.

1356 Stanway, Viola. **Laboratory germination of cottonseed at three different temperatures.** *Proc. Ass. off. Seed Anal. N. Amer.* 1960, **50**, No. 1, 97–100, bibl. 6. [Univ. Missouri, Columbia]

Forty-five samples of cottonseed were tested at 3 different temperature regimes, namely, at temperatures alternating daily between 20 and 30°C and 20 and 35°C, and at a constant temperature of 30°C. Nine samples each of the varieties Auburn 56, Delfos, D.P.L., Fox, and Rex were allowed to germinate. Although there was a significant variety × temperature treatment interaction, the temperature alternating between 20 and 30°C, prescribed in the present Rules of the Association of Official Seed Analysts, appears to be as good as either of the other temperature treatments studied. F. s.—R.H.F.

1357 Satyanarayan, Y. and Ranadive, J. P. **The weed flora of North Gujerat cotton**

fields. *Indian Cott. Gr. Rev.* 1960, **14**, No. 2, 131–6, bibl. 12. [Inst. Sci., Bombay 1]

A table gives a list of 91 weed species, their local names, and flowering and fruiting periods. A brief account is given of the control, by cultivation methods, of the following weeds : *Cyperus rotundus, Cynodon dactylon, Epaltes divaricata, Vicoa indica, Eclipta alba* and *Striga densiflora*.—D.B.

1358 HARRIS, V. C. **Weed control in cotton over a ten-year period by use of the more promising materials and techniques.** *Weeds* 1960, **8**, No. 4, 616–24. [Mississippi Agric. Exp. Sta., State College]

Dinoseb, monuron and 2,4,5-TES were tested for pre-emergence application, LHO-1 (a herbicidal oil) and dicryl for post-emergence ; and chlorpropham and diuron for both. The best of these was diuron pre-emergence and again post-emergence after an interval of 4 – 6 weeks, at 1 lb/ac on each occasion. Weeds (*Digitaria sanguinalis, Amaranthus* spp., *Sida spinosa, Ipomoea purpurea*) were controlled, although some spot hoeing was necessary in most seasons. The cost was less than the cost of hand-hoeing, and the yield of cotton was almost the same. Dicryl, tested in the final year only, also showed promise. Cotton stands were not affected by herbicide treatment, but the plants showed some phytotoxic effects when dinoseb, diuron or dicryl were applied too heavily.—J.D.J.

1359 TOLEDO, F. F. de. Germinação de sementes de algodão tratadas com fungicidas e inseticidas sistêmicos. [**Germination of cotton seeds treated with fungicides and systemic insecticides.**] *Rev. Agric. Piracicaba* 1960, **35**, No. 3, 173–8, bibl. 8, English abstract. [Esc. Agric. L. de Queiroz, Piracicaba, S. Paulo, Brazil]

Seeds of the cotton varieties I.A.C.9 and I.A.C.11 were treated with the fungicides captan and cerenox and/or with the insecticides thimet and disyston. Results showed that these treatments did not affect the number of plants produced 30 days after sowing.—E.B.O.

1360 DEPARTMENT OF AGRICULTURE, UGANDA. [**Control of cotton insects with DDT.**] *Rep. Dep. Agric. Uganda 1959* 1960, 25–6.

Cotton sown in May, June or July, was sprayed with DDT at 1 lb/ac per application, 4 times (at 10-day intervals) beginning at (a) 1st bud, (b) 8 weeks from [seedling] emergence, and (c) 1st flower, for the control of spiny bollworm (*Earis*). Each time of treatment produced a striking and similar increase in yield of seed cotton for each sowing date, the average in lb/ac being, for treatment and control, respectively : May, 1148 and 878 ; June, 1003 and 604 ; July, 531 and 324. This experiment, and preliminary results from another, confirmed the recommendation to spray 4 times at 10-day intervals beginning 8 weeks after emergence.—R.H.F.

1361 DALE, J. E. and COAKER, T. H. **Growth and yield of cotton sprayed with DDT in east and north Uganda.** *Emp. J. exp. Agric.* 1961, **29**, No. 113, 1–13, bibl. 12. [Emp. Cott. Grow. Corp., Namulonge, Uganda]

At 3 out of 6 centres, where cotton trials were conducted, spraying with DDT 8 weeks after sowing increased yields by 93, 78 and 57%, compared with yields of unsprayed cotton, but at the other 3 centres it reduced yields by 5, 6 and 21%. Spraying reduced both leaf tattering caused by *Lygus* spp. and the percentage of fruiting bodies shed. At 4 centres the sprayed crops were set earlier ; unsprayed plants had a higher growth rate than sprayed plants but at 1 centre only did this result in a yield equal to that of the sprayed plants. At the other 2 centres the growth rate of sprayed plants was similar to that of unsprayed plants. It is suggested that where environmental factors do not favour continued crop formation, spraying is likely to increase yield appreciably. F.s. —E.B.O.

1362 VAN DER LAAN, P. A. **Toxaphene and delnav as insecticides on cotton in the Sudan Gezira.** *Emp. Cott. Gr. Rev.* 1961, **38**, No. 2, 111–18, bibl. 5. [Gezira Res. Sta., Sudan]

In a field experiment DDT, toxaphene, delnav and endrin were compared for control of *Bemisia tabaci* and *Empoasca lybica*. With DDT, 2–3 weeks after initial control, a population of *B. tabaci* revived. The other insecticides controlled both insects, endrin being particularly effective against *B. tabaci*.—R.H.F.

1363 WENE, G. P. and others. **Control of the beet armyworm on cotton in Arizona.** *J. econ. Ent.* 1961, **54**, No. 1, 192–3, bibl. 3.

Seven experiments were carried out on cotton heavily infested with the beet armyworm (*Spodoptera exigua*) in south central Arizona in July 1959. It was found that best control was given by one sprayed application of dipterex at 1·5 lb/ac. Good control was also obtained by spraying 0·9 dilan + 0·3 lb endrin, whilst slightly less control was given by dibrom (0·5 or 1 lb) + endrin (0·4 or 0·2 lb). —R.H.F.

1364 LEIGH, T. F. **Insecticidal susceptibility of *Nysius raphanus*, a pest of cotton.** *J. econ. Ent.* 1961, **54**, No. 1, 120–2, bibl. 6, illus. [Univ. California]

Endrin at 0·5 lb active ingredient/ac and heptachlor at 0·6 lb a.i/ac applied in 20 gal [aqueous] solution per acre controlled existing populations of *Nysius raphanus* on cotton in 1959 at Shafter, California.—R.H.F.

1365 Schnathorst, W. C. and Halisky, P. M. **Potentially serious cotton disease, angular leaf spot established in California.** *Calif. Agric.* 1960, **14**, No. 11, 5–6, illus.

The occurrence of angular leaf spot (*Xanthomonas malvacearum*) appears to be associated with the use of sprinkler irrigation. Gins are a likely source of transfer of infection from diseased to disease-free seed. Control measures are given.—R.H.F.

1366 Lane, H. C. **Simulated hail damage experiments in cotton.** *Bull. 934 Texas agric. Exp. Sta.* 1959, pp. 16, bibl. 18, illus.

Experiments were carried out to simulate various degrees of hail damage to cotton plants. Treatments included spacing, defoliation, severing the stem above the lowest node or at the middle joint, stem bruises and combinations of these injuries. Stands could be thinned substantially below the average without reducing yields. The optimum stand was found to be 2 plants per ft of row. Total defoliation retarded recovery and delayed maturity, but the cotton plant was not markedly affected by removal of one-third or two-thirds of the leaves, and it regenerated new leaves rapidly. Removal of the terminal bud did not reduce yields significantly. Early-season stem injuries did not affect growth and fruiting, and treated plants did not lodge. Plants recovered after the stem was severed above the lowest node or at the middle joint. Early-season injuries did not reduce yield greatly in either case, but considerable loss in yield resulted from treatments later in the season, particularly after the low cut. A test of the effect of various levels of defoliation in combination with other injuries revealed that no large additional yield decreases resulted from the combinations except with 100% defoliation. The effect of hail injuries on fibre properties could not be evaluated. F. s.—A.M.H.

1367 Nosov, A. K. and Poljanskaja, L. A. **[Physiology of seedlings from fine-stapled cotton seed.]** [Russian] *Izv. Akad. Nauk Turkmen. SSR (Bull. Acad. Sci. Turkmenian SSR)* 1960, No. 6, 18–28, bibl. 18, illus. [Bot. Inst., Acad. Sci. Turkmenian SSR]

1368 Saini, A. D. and Gadkari, P. D. **Some preliminary observations on the foliar anatomy of Indian cottons.** *Indian Cott. Gr. Rev.* 1960, **14**, No. 2, 89–95, bibl. 8, illus. [Inst. Pl. Ind., Indore]

Leaf anatomy was studied in 7 varieties of each of *Gossypium arboreum, G. herbaceum* and *G. hirsutum*. In general, varieties from dry regions had thicker leaves than those from moist regions. There was a greater range of thickness in *G. herbaceum* and *G. hirsutum* than in *G. arboreum*. The cell layer of the upper and lower epidermis in the tetraploid species, *G. hirsutum*, was thicker than in the other 2 species. In *G. hirsutum* and in young plants of the Asiatic species (*G. arboreum* and *G. herbaceum*) the internal anatomy of the leaf is of the dicotyledonous type, but mature plants of the Asiatic species have an upper and lower palisade tissue with a reduced spongy mesophyll between. The change from spongy mesophyll to palisade cells was investigated. It sets in at the 6th node and is complete at the 12th node. In all species and varieties, leaf, epidermis and palisade tissue became thinner as the position of leaf insertion on the stem became higher. The various findings were related to climate of origin of the species. Varieties of xerophytic origin had thicker leaves, thicker palisade tissue and smaller epidermal cells (and therefore thinner epidermis) than varieties grown in moist regions.—D.B.

1369 Farbrother, H. G. **Solar radiation, crop [cotton] water relations, and nylon unit calibrations.** *Progr. Reps Exp. Stas Cott. Gr. Corp. Uganda 1959-60* 1960, 16–23.

Two Gunn-Bellani radiation integrators were tested against a Kipp integrator by taking hourly values for 10 days. Readings of small quantities of distillate in the morning and evening were subject to error, but the pattern of readings over the important daylight hours was satisfactory. The newly installed Kipp solarimeter demonstrated that Penman's formula under-estimates evapotranspiration at the latitude and altitude of Namulonge, while the revised formula of Glover and McCullich over-estimates it. Irrigated and non-irrigated plots, with nylon resistance units at 3 depths, were used to estimate water losses by transpiration from cotton. Besides furnishing checks on theory, these plots indicated that the root system of the Albar variety withdrew moisture from depth more efficiently than that of NC58. On 2 recent occasions the resistance/moisture curves of plain nylon units have been affected by leaching after heavy rain, and it is hoped to plot the downward movement of fertilizers by recording the difference in resistance between plain units and units buffered with plaster of paris. —J.D.J.

1370 Dale, J. E. **Investigations into the stomatal physiology of Upland cotton. 1. The effects of hours of day, solar radiation, temperature and leaf water-content on stomatal behaviour.** *Ann. Bot., Lond.* 1961, **25**, No. 97, 39–52, bibl. 17. [Cott. Res. Sta., Namulonge, Uganda]

1371 Dale, J. E. and Milford, G. F. J. **Investigations into the physiology of bud and boll shedding.** *Progr. Reps Exp. Stas Cott. Gr. Corp. Uganda 1959-60* 1960, 15–16.

The flower production of cotton plants grown in polythene bags in the glasshouse was not affected by differential watering, but more bolls were retained when watering was intermittent than when it was continuous. When the NPK dosage was raised from 1 to 2 g per kg of soil, flower production was increased by 25% and there was slightly less [boll] shedding. In another glasshouse experiment it was established that when a flower is removed the pedicel invariably abscinded. In the field, spraying cotton with gibberellic acid had no effect on yield or the number of bolls picked.—J.D.J.

1372 Belkina, V. I. and Rabočev, I. S. **[The limits of soil salinization in evaluating the salt-tolerance of cotton.]** [Russian] *Izv. Akad. Nauk Turkmen. SSR (Bull. Acad. Sci. Turkmenian SSR)* 1960, No. 6, 12–17, bibl. 21. [Čardžou Exp. Sta., Turkmenian SSR]

1373 Mendes, H. C. Nutrição do algodoeiro. 2. Absorção mineral por plantas cultivadas em soluções nutritivas. **[Cotton nutrition. 2. Mineral absorption by plants grown in nutrient solutions.]** *Bragantia* 1960, **19**, No. 28, 435–58, bibl. 13, English summary. [Inst. Agron. Campinas, São Paulo, Brazil]

Plants of the cotton (*Gossypium hirsutum*) varieties I.A. Campinas 817 and I.A. 7387–24940 were grown in nutrient solutions for 150 days, and the amounts of N, P, K, Ca, Mg, S and Fe absorbed from the solutions were calculated at 10-day intervals. It was found that about one-fifth of the total Mg, S and Fe was taken up during the first 30 days of growth. The uptake of N, P, K and Ca was highest during flowering (from the 30th to the 60th days of the growth cycle). At the end of this period the plants had taken up about half of the total N, K, Ca and S absorbed during the whole period of the trial. When the first bolls opened (120 days), the plants had absorbed practically 90% of the total amounts of each element studied. F. s.—E.B.O.

1374 Mendes, H. C. and others. Nutrição do algodoeiro. 3. Efeitos de micronutrientes em plantas vegetando em vasos. 4. Efeitos da diluição da composição da solução nutritiva. **[Cotton nutrition. 3. Effects of micronutrients on plants grown in pots. 4. Effects of diluting the composition of the nutrient solution.]** *Bragantia* 1960, **19**, Notes 17 and 18, 77–93, bibl. in text, illus., English summary. [Inst. Agron. Campinas, São Paulo, Brazil]

With cotton (*Gossypium hirsutum*) plants grown in pots filled with " terra-roxa-misturada " soil, no significant differences in growth or yield were obtained from the addition of several micronutrients, but results from foliar diagnosis showed significant differences due to some treatments. In another series of trials, cotton plants were grown in a complete Hoagland's nutrient solution until they began to set the first squares. This solution was then replaced by others with diluted levels of N, P, K, Ca and Mg. Control plants continued to receive the complete solution. The results showed that the control plants yielded better than those receiving any of the other treatments. They also indicate that, in order to study the effect of varying levels of nutrients on the cotton plant, the differential treatments should be started before the plants begin to set squares. Data of foliar diagnosis are presented and discussed. F. s.—E.B.O.

1375 Guseinov, B. Z. and Džafarova, F. S. **[The effect of growth substances of petroleum origin on the carbohydrate- and protein-metabolism of the cotton plant.]** [Azerbaĭdžan] *Doklady Akad. Nauk Azerbaĭdžan. SSR (Proc. Acad. Sci. Azerbaĭdžan SSR)* 1960, **16**, No. 5, 503–6, bibl. 11, Russian summary. [Bot. Inst.]

There is evidence that these growth substances intensify the accumulation of carbohydrates and nitrogenous substances in the plant. It is recommended that the substances be used to improve cotton yields. Spraying the plants with the growth substances at 0·005% – 0·05% concentration is adequate.—M.H.

1376 Younis, A. E. and Hammouda, M. A. **Presowing gamma irradiation of cotton seeds from a point source of Cs^{137} and its effect on emergence, growth and yield.** *Plant and Soil* 1961, **13**, No. 4, 311–21, bibl. 15, illus. [Univ. Cairo, Egypt]

Dry seeds of *Gossypium barbadense* var. Karnak were given a total of 1·17, 1·86, 3·43, 6·73 or 26·92 kr gamma rays over a 38-hr period and sown immediately after treatment. Heavy irradiation reduced seedling emergence, inhibited growth, delayed flowering and decreased the number of flowers and bolls produced. At low dosages, cotton yields were similar to those of the controls, while at high dosages yields were greatly reduced. Irradiation had no significant stimulating effect on growth and development, and little effect on boll shedding.—R.B.

FIBRE FLAX

1377 Anspok, P. I. **[The effect of microelements on yields and quality of *Linum* sp.]** [Russian] *Lĕn i Konoplja (Flax and hemp)* 1961, **6**, No. 4, 27–8. [Biol. Inst., Acad. Sci. Latvian SSR]

1378 Dunham, R. S. and others. **Crop rotation and associated tillage practices for**

controlling annual weeds in flax and reducing the weed seed population of the soil. *Tech. Bull. 230 Minnesota agric. Exp. Sta.* 1958, pp. 20, bibl. 14, illus.

Two crop rotations, maize/flax/lucerne/lucerne, and oats/flax/red clover and timothy/maize, were followed for 10 years, so that 3 flax crops (grown for both straw and seed) were taken from each. Neither rotation by itself reduced the annual weed seeds in the soil, nor controlled annual weeds in the flax crop. Certain tillage practices applied to the crops immediately preceding flax reduced weed seeds in the soil and weeds in the flax, and increased flax yields, but these practices had no long-term cumulative effect in cleaning the soil. Some general observations on weed seeds, incidental to the enquiry, are recorded.—J.D.J.

1379 Spek, J. van der. **Control of *Botrytis* infection of flax seed.** *Fibra* 1961, **6**, No. 1, 29–31, bibl. 10, German summary. [Netherlands]

Rapid drying of the flax crop after rain counteracts *Botrytis* infection of the plants and the seed. Although infection can be reduced considerably by cultural measures, the rainy summers common in the Netherlands make it impossible to control the disease completely in that way. Seed treatment by volatile mercurial fungicides (panogen, aabiton liquid or dry, and aagrano '48 dry) is satisfactory if applied a considerable time before sowing (3–4 weeks at least) at a rate not exceeding 3 g per kg of seed. This method is intended for seed with medium to heavy infection. For seed that is slightly infected (up to 5%) or for healthy seed, seed protectants based on thiram (or thiram plus mercury), captan or quinone are recommended.—E.B.O.

1380 Pietkiewicz, T. A. and Czyzewska, S. Wpływ zaprawiania nasion na infekcje, siewek lnu przez grzyb *Colletotrichum lini* Manns et Bolley. **Influence of seed treatment on infection of flax seedlings by the fungus *C. lini*.** *Roczn. Nauk rol.* 1960, **81**, Ser. A, No. 3, 671–710, bibl. 64, English and Russian summaries.

In field tests, the early infection of seeds by *Colletotrichum lini* was reduced by all the fungicide dusts employed, but never totally eliminated. The action of thiram dusts was better than that of the organo-mercury dusts. The effect of treatment depended in great measure upon the soil and air humidity and upon the soil air temperature prevailing from the time of sowing until the phase of 2 – 4 pairs of leaves. The effect of treatment was reduced in warm and wet weather. F. Eng. s.—G.M.R.

1381 Jacquemart, J. Origine et croissance des fibres du lin. [**Origin and growth of flax fibres.**] *Fibra* 1961, **6**, No. 1, 32–8, English summary.

1382 Department of Agriculture, Canada. **Genetics, cytogenetics and physiological research. Flax.** *Rep. Minist. Agric. Canad. 1958-9* 1959, 91. [Received Jan., 1960]

The flax vars Raja and Redwing were studied in growth cabinets to determine why Raja matures much later than Redwing in northern areas but not in southern. Red radiation accelerated the development of Raja much more than that of Redwing. Raja required a higher temperature after flowering to achieve equal maturity. Other varieties also varied in their ability to respond to red radiation and temperature.—A.M.H.

HEMP

1383 Škvar, Ja. Ja. [**Application of ammonium hydroxide for the nutrition of *Cannabis sativa*. (Experiments from collective farms in the Čerkass region.)**] [Russian] *Lën i Konoplja* (*Flax and Hemp*) 1961, **6**, (23), No. 3, 33.

1384 Zakordonec, A. I. **The K stimulator and its effect on plants.** [Ukrainian] *Ukr. bot. Ž., Kiev* (*Ukrainian bot. J.*) 1960, **17**, No. 6, 23–7, bibl. 3, illus., English and Russian summaries.

The K stimulator is a substance isolated from *Fusarium moniliforme* [conidial stage of *Gibberella fujikuroi*]. A 0·02% solution of K stimulator increased the yield of hemp fibre by 50%. F. Eng. s.—D.B.

1385 Heslop-Harrison, J. **Suppressive effects of 2-thiouracil on differentiation and flowering in *Cannabis sativa*.** *Science* 1960, **132**, No. 3444, 1943–4, bibl. 4, illus. [Queen's Univ. Belfast]

KENAF

1386 Marassi, A. L'ibisco da fibra in Spagna e in Italia. [**Kenaf for fibre in Spain and Italy.**] *Riv. Agric. subtrop.* 1960, **54**, No. 1–3, 14–33, bibl. 9, illus., English summary. [Ist. Agron. Oltremare, Firenze, Italy]

This article is concerned mainly with trials on kenaf (*Hibiscus cannabinus*) grown for fibre and seed in Italy. Near Florence, the varieties Tingo Maria and Javanese showed promise where grown for seed.—E.B.O.

GENERAL

1387 Nazif, S. **Fibre crops in Egypt.** 1958, pp. 20, Cairo : Ministry of Agriculture, Egypt, 35 mills. [Received Feb., 1961]

Information is given on growing the following crops in Egypt : fibre flax, teel (*Hibiscus cannabinus*), roselle (*H. sabdariffa*), jute and *Abutilon avicennae*.—C.L.S.

OIL CROPS

SESAME

1388 Singh, S. P. **Morphological studies in some members of the family Pedaliaceae 1. *Sesamum indicum* D.C.** *Phytomorphology* 1960, **10**, No. 1, 65–82, bibl. 37, illus. [Dep. Bot., B.R. College, Agra, India]

Observations are recorded on floral morphology, organogeny of the flower, development of the nectary, vascular supply of the flower, vascular supply of the nectary, microsporogenesis and the male gametophyte, megasporogenesis and the female gametophyte, the endosperm, embryo, seed and fruit.—D.B.

1389 Mazzani, B. Variaciones del contenido en aceite de la semilla en cultivares locales de ajonjolí. 2. Su correlación con otras características de la planta. [**Variations of the oil content in the seed of local cultivars of sesame. 2. Their correlation with other characteristics of the plant.**] *Agron. trop., Maracay* 1959, **9**, No. 3, 87–92, bibl. 2, English summary. [Cent. Invest. Agron., Maracay, Venezuela] [Received March, 1961]

In an investigation with sesame cultivars, the average oil content of 5 branched varieties was 56·6% and of 5 non-branched varieties 54·5%. This difference was significant. [See also *Fld Crop Abstr.* 14 : 350.]—E.B.O.

OIL-SEED FLAX

See also Abs. 1378.

1390 Knowles, P. F. and others. **Flax production in the Imperial Valley.** *Circ. 480 California agric. Exp. Sta.* 1959, pp. 27, illus.

Flax, here, is an irrigated winter crop grown for linseed oil. The acreage is much less than in N. Dakota or Minnesota, but yields are more than twice as high. All aspects of cultivation of the crop are described, with emphasis on the control of weeds and diseases. There are also sections on harvesting and marketing, linseed oil, feed value of the straw, production costs and research.—J.D.J.

1391 Plonka, F. Obtentions récentes de variétés de lin oléagineux et orientation des sélections en cours. [**Varieties of oil-seed flax recently obtained and present trends of selection (in France).**] *Oléagineux* 1961, **16**, No. 4, 261–2. [Cent. Nat. Rech. Agron., France]

In France, linseed oil is obtained mainly from oil-seed flax but also from the seed of flax grown primarily for fibre. No use is generally made of the fibre of oil-seed flax. Dual-purpose flax varieties are not cultivated. Two new varieties of oil-seed flax, Lilas and Gentiane have recently been released. Future possibilities of flax in France are examined.—E.B.O.

1392 Kedharnath, S. and others. **Correlation studies in *Linum usitatissimum*. 2. Effect of morphological grouping of types on the correlation coefficients relating to yield and some of the components of yield. 3. Effect of morphological grouping of types on the correlation coefficients relating to oil content and oil quality.** *Indian J. Genet.* 1960, **20**, No. 1, 58–68 and 69–78, bibl. 4. [Indian Agric. Res. Inst., New Delhi]

SAFFLOWER

1393 Pawlowski, S. H. **Estimation of oil in safflower seed.** *Nature, Lond.* 1961, **189**, No. 4766, 772–3, bibl. 1. [Canada Agric. Res. Sta., Lethbridge, Alberta]

SUNFLOWER

1394 Bengtsson, A. Försök med solros som grönfoderväxt. **Trials with sunflower as a fodder plant.**] *Medd. Stat. JordbrFörsök, Uppsala* 1960, No. 104, pp. 20, bibl. 11, illus., German summary. [Kungl. Lantbrukshögskolan och Statens Lantbruksförsök, Uppsala, Sweden]

At Ultuna (central Sweden), the effect was studied of row spacing (26, 39 and 52 cm) and seed rate (25, 50 and 75 kg/ha) on yield and quality of *Helianthus annuus* when cut in the flower-bud stage. Highest yields were obtained from a seed rate of 75 kg/ha, a row spacing of 26 cm and a density of 53 plants per m^2. The chemical composition of the herbage was independent of plant density, but varied with weather. In a wet season, yields were higher and quality poorer than normal ; in a dry season, yields were lower but quality, largely due to an increase in sugars, was better. F. Ger. s.—D.B.

1395 Levin, A. M. and Žebin, D. F. [**The effect of pre-sowing application of fertilizers on yields and oil content of the seed of sunflower.**] [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1960, No. 2(122), 197–201. [Fruit/Vegetable Inst., Mičurinsk]

1396 Hewitt, E. J. and Notton, B. A. **Estimation and distribution of some phosphorus fractions in leaves of plants.** *J. Sci. Fd Agric.* 1960, **11**, No. 11, 653–8, bibl. 8. [Univ. Bristol Res. Sta., Long Ashton, Bristol]

Mustard [*Sinapis alba*] and sunflower [*Helianthus annuus*] were included in the investigations.—S.M.J.

1397 Benecкaja, G. K. [**The biology of flowering in sunflower.**] [Russian] *Agrobiologija* (*Agrobiology, Moscow*) 1960, No. 2(122), 266–7.

1398 Sackston, W. E. and Chernick, Barbara M. **Effects of chemical treatment and storage on sunflower seeds.** *Canad. J. Pl. Sci.* 1960, **40,** No. 4, 690–9, bibl. 18, illus. [Canada Dep. Agric., Winnipeg, Manitoba]

Seeds of Sunrise sunflowers were treated with 14 common chemical seed dressings at 1·5 and 15 oz per bu and stored for up to 4·5 years. At intervals, samples of seeds were sown in soil beds in a glasshouse, and plated on agar in petri-dishes. Viability of stored seed was not affected adversely by treatment with 1·5 oz per bu of any chemical tested. Treatment with 15 oz per bu of some mercurial preparations markedly reduced germination and induced characteristic symptoms of mercury poisoning in surviving seedlings. No injury was caused by the non-mercurial materials. Growth of fungi from treated seeds plated on agar was effectively prevented by most of the mercurial chemicals even at 1·5 oz per bu. Several of the non-mercurial materials reduced the number of fungus colonies, but none gave complete control. F. S.–R.B.

1399 Voisin, J.-C. Perspectives nouvelles en France pour le tournesol. [**Prospects for sunflower in France.**] *Oléagineux* 1961, **16,** No. 4, 263–4, bibl. 12. [Cent. Tech. Oléag. Métrop., Paris]

RAPE

1400 Kivi, E. I. Syysrypsi. **Winter turnip rape.** *Tamm. Hankk. Kasvinj. Siemenjulk.* 1960, 63–7, illus., English summary. [Hankkija Co-op. Soc., Finland]

Winter turnip rape is an extremely sensitive and uncertain plant to grow under Finnish conditions. Varietal trials were not begun until 1955 and, owing to dry sowing periods or bad winter conditions, successful results were obtained only in 1958 and 1959. Gruber I was the most successful variety. The Swedish Duro does not winter so well as the Rapido varieties but, thanks to its more luxuriant growth, it gives equally good yields. The first appreciable results in ensuring crop yield have been obtained through cultural measures : breeding work is handicapped by the total lack of indigenous varieties adapted to the regional conditions. Use is to be made in future of wild *Brassica* species. F. Eng. s.—G.M.R.

1401 Mallet, C. Le désherbage chimique du colza. [**Chemical weeding of rape.**] *Oléagineux* 1961, **16,** No. 4, 247–50, bibl. 11. [Cent. Tech. Oléag. Métrop., Paris]

In trials in 1958–60, dalapon at 2·5 kg (commercial preparation) per ha gave good control of grass weeds in rape [*Brassica napus*] treated at the 3–4 leaf stage in autumn.—E.B.O.

1402 Waede, M. Versuche zur Bekämpfung der Kohlschotenmücke (*Dasyneura brassicae* Winn.) in blühenden Ölfruchtbeständen mit Hilfe des Kaltnebelverfahrens. [**Trials for controlling *D. brassicae* in flowering stands of oil crops, using a cold aerosol.**] *NachrBl. dtsch. PflSchDienst. Braunschweig* 1960, **12,** No. 5, 65–70, bibl. 19, illus. [Biol. Bundesanst., Inst. f. Getreide-, Ölfrucht- u. Futterpflanzenkrankheiten, Kiel-Kitzeberg, German Fed. Rep.]

Stands of winter rape and winter turnip-rape in the flowering condition were treated with thiodan, toxaphene and dichlordiphenyltrichlorethane applied as cool aerosols at the rate of 1500 g/ha. No technical difficulties were experienced. The cloud penetrated gently into and across the whole width of the oil-crop stand. The best time for treatment was oviposition, at the beginning of flowering of the oil crop. The action of all 3 insecticides on *D. brassicae* was satisfactory, but thiodan was recommended because it also attacks *Ceutorrhynchus assimilis*. Costs are discussed. —D.B.

GENERAL

1403 Martin, A. L. D. and others. **Oilseeds committee report.** *Rep. Ann. Conf. Manitoba Agronomists* 1959, 8–13. [Received Feb., 1960]

Data on yield and agronomic characters of the flax vars Redwood, Rocket, Marine, Raja and Sheyenne at 4 centres in 1959 and zonation-test data for the same varieties are tabulated. Yield and agronomic data for Acme, Crest and Flambeau soyabeans, yield data for Golden, Argentine, Arlo and Polish rapeseed and agronomic data for Advance, Advent and Beacon sunflowers are listed. Factors influencing the quality of oilseeds are briefly discussed.—A.M.H.

MISCELLANEOUS CROPS

BUCKWHEAT

1404 Kreindler, J. and Pfeifer, R. **Sow buckwheat early 3 to 6 pecks per acre.** *Sci. Fmr* 1960, **8,** No. 1, 3, [Agron. Res. Farm, Pennsylvania State Univ., Pa]

The Silverhull type of buckwheat gave best results from a 2-yr trial [details not given] when

sown between 4 June and 1 July at rates of 3 – 6 pecks [36–72 lb]/ac.—R.H.F.

1405 Petrova, Z. V. **[The best varieties of buckwheat.]** [Russian] *Zemledelie* (*Agriculture, USSR*) 1961, **23**, No. 2, 15–19.

There is information on yields from *Fagopyrum* [*esculentum*] var. Bogatyr' and Šatilovskaja when sown in different provinces of the Ukraine.—M.H.

GENERAL

1406 Bennett, D. C. **The basic food crops of Java and Madura.** *Econ. Geogr.* 1961, **37**, No. 1, 75–87.

The distribution and cultivation areas of the following crops are discussed : irrigated rice, unirrigated rice, maize, cassava, soyabeans, groundnuts and sweet-potatoes.—R.H.F.

1407 Department of Agriculture, Tanganyika. **Control of termite damage to crops.** *Rep. Dep. Agric. Tanganyika 1959* 1960, 12.

Aldrin applied as 40% wettable powder in fertilizer to crops of maize, sunflower, soyabeans and sesame secured better plant populations at harvest and better yields. As a 40% seed-dressing a dosage of nearly 1 in 100 w/w was required, and better plant populations and yields were secured only in the case of maize and soyabeans. The seed-dressing reduced the amount of sunflower seed removed by mice. It is estimated that an expenditure of 27 shillings on materials should give returns of 75 – 140 shillings according to crop. —J.D.J.

1408† Wiklert, P. Studier av rotutvecklingen hos några nyttoväxter med särskild hänsyn till markstrukturen. **[Studies on root development of some utility plants with special regard to soil structure.]** *Grundförbättring* 1960, **13**, No. 3, 113–48, bibl. 13, illus., English summary.

The crop plants examined were : turnip rape, winter- and spring-wheat, barley, oats and rye. [See *Herb. Abstr.* 27 : 1577].—A.G.G.H.

1409 Lea, J. D. **Studies on the depth and rate of root penetration of some annual tropical crops.** *Trop. Agric., Trin.* 1961, **38**, No. 2, 93–105, bibl. 9, illus. [Overseas Fd Corp. Res. Sta., Kongwa, Tanganyika and Central Rainlands Res. Sta., Tozi, Sudan Rep.]

At Kongwa, in a moderately acid, red sandy loam and at Tozi, in an alkaline heavy clay, the rooting systems of several annual crops were studied *in situ* under field conditions. At Kongwa, the vertical penetration of the tap-root of Natal Common groundnuts proceeded at the rate of 1 in./day for 60 days and finally reached a mean depth of 68·3 in. at 100 days. Large primary lateral roots approached a similar depth after limited initial horizontal or oblique development, and adventitious laterals were produced from the hypocotyl at 35 days. A similar pattern of tap- and primary-root development was observed for cotton. At Tozi, the tap roots of Natal Common groundnuts penetrated at the rate of 1 in./day for 20 days and finally reached 37·8 in. after 72 days. Soil moisture was limiting below 31 in. Sesame roots grew slightly less rapidly and reached 33 in. by 94 days. With a dwarf sorghum (Combine Kafir 60), seminal roots reached their maximum depth of 25·4 in. at 22 days and adventitious roots subsequently spread to 23·4 in. laterally and reached a depth of 43·3 in. at 89 days. The cotton variety BAR 7/8.1 in the following year, 1951, rooted to 42 in. after 60 days. In comparing the 2 localities, at Kongwa there was apparently no restriction to depth of rooting under favourable rainfall whereas at Tozi, rainfall penetration, after the dry season, was much shallower and slower, and crop rooting was restricted to the moist zone.—R.H.F.

1410 Prevot, P. Enquête sur les analyses chimiques de diagnostic foliaire réalisées dans huit laboratoires. **[Investigation into chemical analyses by foliar diagnosis carried out at 8 laboratories.]** *Oléagineux* 1961, **16**, No. 4, 241–5.

Determinations of N, P, K, Ca and Mg, by foliar diagnosis, were carried out on various crops, including groundnuts, cotton, maize and rice, at 7 laboratories in France and 1 in Viet-Nam. For each crop, the samples examined were from identical material. Results (tabulated) showed small but significant differences between the average content of each element, found at the various laboratories. The greatest differences were in the Mg values.—E.B.O.

CROP BOTANY

GERMINATION

1411 Delouche, J. C. and Caldwell, W. P. **Seed vigor and vigor tests.** *Proc. Ass. off. Seed Anal. N. Amer.* 1960, **50,** No. 1, 124–9, bibl. 24. [Mississippi Agric. Exp. Sta., State Coll.]

The importance of vigour as a factor complementary to viability is stressed. Methods for assessing seed vigour indirectly under laboratory conditions are discussed.—R.H.F.

1412 Rice, W. N. **Development of the cold test for seed evaluation.** *Proc. Ass. off. Seed Anal. N. Amer.* 1960, **50,** No. 1, 118–23. [Iowa State Coll. Seed Lab.]

In this test, seeds are subjected to a germination test in a medium (described) supplying conditions more nearly corresponding with those in the field (particularly with respect to temperature, soil moisture and infestation of *Pythium*) than those obtaining in the standard procedure. The method was applicable to maize, soyabean and peas among other crops.—R.H.F.

1413† Collis-George, N. and Sands, J. E. **Moisture conditions for testing germination [of seeds].** *Nature, Lond.* 1961, **190,** No. 4773, 367, bibl. 4.

It is pointed out that The International Standards for Seed Testing detail the requirements for assessing the viability of many species, but provide only general directions for the moisture regime to be used. The authors have adapted simple experimental equipment to determine the influence of small changes of suction, at or about zero suction, in the substrata used in seed germination tests. It is suggested that small variations in moisture regime can be the cause of inconsistencies attributed to other factors. If seeds could be germinated on tension plates, a suction for optimal germination could be specified for each species, thus eliminating the use of various types of substrata.—A.G.G.H.

1414† Côme, D. Étude expérimentale de la perméabilité à différents gaz du tégument de quelques graines de taille réduite. [**Experimental study of the permeability of the coat of some small seeds to different gases.**] *C.R. Acad. Agric. Fr.* 1961, **47,** No. 1, 55–62, bibl. 2, illus. [Lab. Biol. Vég. Sta. du Froid, Bellevue, France]

The permeability of seed coats to gases can be studied by a technique based on the "Devaux effect". In this article some results of its application to small seeds are reported. With small seeds, the sensitivity of the method is increased considerably by the addition of a capillary tube on which the seed, or the isolated seed coat, is fixed. This allows one to study and measure the diffusion of gases (O_2, CO_2 and H_2) through the seed coats. It is intended to apply this technique particularly to the study of dormant seeds.—E.B.O.

METABOLISM AND PLANT CHEMISTRY

1415† González, B. F. Una nueva técnica para determinar el déficit de la presión de difusión (DPD) en las plantas, con fines ecológicos. [**A new technique for determining, for ecological purposes, the deficit of diffusion pressure in plants.**] *An. Edafol. Agrobiol.* 1960, **19,** No. 5, 271–7, bibl. 13, German summary. [Inst. Nac. Edafol. y Agrobiol., Madrid]

An examination of the principal criteria used for studying the biological activity of plants in relation to their water supply indicated that the measure of the deficit of diffusion pressure is one of the most adequate physiological indexes. A new apparatus is described which allows the photographic study of distension of tissues immersed in sugar solutions and the determination of the isotonic solution. F. s.—E.B.O.

1416† Voznesenskiĭ, V. L. [**The changes of conductivity of the absorbing alkali solution as a means of measuring photosynthetic rate.**] [Russian] *Trudy Bot. Inst. V.L. Komarova (Trudy Inst. bot., Acad. Sci. USSR* (4) *Exp. Bot.*) 1960, Ser. 4, No. 14, 258–83, bibl. 64, illus., English summary.

1417 Boawn, L. C. and others. **Effect of nitrogen carrier, nitrogen rate, zinc rate, and soil pH on zinc uptake by sorghum, potatoes, and sugar beets.** *Soil Sci.* 1960, **90,** No. 6, 329–37, bibl. 10. [Washington Agric. Exp. Sta., USA]

1418 Effmert, B. Über das Natrium als Pflanzennährstoff, untersucht an Speisemöhren, Sommerweizen und Ackerbohnen. [**Sodium as a plant nutrient. Investigations with carrots, spring wheat and field beans.**] *Z. PflErnähr. Düng.* 1960, **89,** No. 2/3, 201–11, bibl. 37. [Inst. PflErnähr. u. Bodenkunde, Martin-Luther Univ., Halle-Wittenberg, E. Germany]

1419 Brown, J. C. and others. **Competition between chelating agents and roots as factor affecting absorption of iron and other ions by plant species.** *Pl. Physiol.* 1960, **35,** No. 6, 878–86, bibl. 25, illus. [USDA, Beltsville, Maryland]

Seedlings of *Phaseolus vulgaris*, *Glycine max* and *Sorghum vulgare* were grown in nutrient solutions to which various quantities of each of 4 chelating agents were added in the presence of various concentrations of iron (as $FeCl_3$). An order of competitive ability of the chelates for the iron was established. Roots of the test species were found to have a differential capacity to compete with the chelates for nutrient Fe (as noted by the development of chlorosis, when Fe uptake was limited), and in this respect they resembled chelates in the mechanism of their Fe absorption.—R.H.F.

1420 Roberts, H. Jr and Menzel, R. G. **Availability of exchangeable and non-exchangeable strontium-90 to plants.** *J. agric. fd Chem.* 1961, **9,** No. 2, 95–8, bibl. 15. [U.S. Dep. Agric., Beltsville, Md]

Exchangeable and non-exchangeable fractions of ^{90}Sr were determined in soil samples from cultivated fields in the coastal plain of N. Carolina in June 1955 and Dec. 1958. Exchangeable ^{90}Sr content averaged about 10 and 50 $\mu\mu$c. per kg of soil on the 2 sampling dates, respectively. Non-exchangeable ^{90}Sr content averaged 4 and 7$\mu\mu$c., respectively. The uptake of ^{90}Sr and Ca from these soils was studied by growing cowpeas in the glasshouse. From 8 to 18% of the exchangeable Sr was taken up, depending on the uptake of exchangeable Ca. Use of discrimination factors to determine availability of non-exchangeable ^{90}Sr to plants is discussed. Non-exchangeable ^{90}Sr apparently made little or no contribution to uptake. F. s.—E.B.O.

1421† Muir, R. M. and others. **Thiocarbamates as plant growth regulators.** *Pl. Physiol.* 1961, **36,** No. 2, 222–5, bibl. 13. [Univ. Iowa, Iowa City and Pomona Coll., Claremont, California]

ENVIRONMENT

1422 Martin, P. and Rademacher, B. Experimentelle Untersuchungen zur Frage der Nachwirkung von Rapswurzelrückständen. [**Trials to investigate the after effect of rape root residues.**] *Z. Acker- u. PflBau* 1960, **111,** No. 2, 105–15, bibl. 19, illus., English summary. [Landw. Hochsch. Hohenheim, Stuttgart-Hohenheim, W. Germany]

An attempt was made to investigate the after effects of substances given off from the root residues of *Brassica napus* var. *oleifera*. When fresh rape roots were incorporated in the soil the growth of wheat seedlings was at first checked, but after 4 days' growth it was stimulated. When roots of wheat or oats were incorporated in the soil, the initial inhibition of growth continued. Heavy manuring levelled out these differences considerably. By chromatographic analysis, a mustard-oil glucoside, already known to exist in the seed of rape, was also found in the roots. Of the volatile mustard oils liberated, the one present in the greatest quantity was β-phenylethyl mustard oil. When this mustard oil was mixed with soil it produced, when present in small quantities, a slight improvement in growth of young wheat plants, but when present in large quantities it caused inhibition of growth. Under glasshouse conditions β-phenylethyl mustard oil was rapidly broken down to give phenylamine as one of the products.—D.B.

1423† Stern, W. R. and Donald, C. M. **Relationship of radiation, leaf area index and crop growth-rate.** *Nature, Lond.* 1961, **189,** No. 4764, 597–8, bibl. 5. [Agron. Dep., Waite Agric. Res. Inst., Univ. Adelaide]

In the course of competition studies at Adelaide, results were secured on the interrelationship between the level of radiation, the leaf-area index and the rate of dry-matter production. An experiment was conducted to study the influence of shading by grass on the growth of an associate clover when the roots of the 2 species were kept separate and there was competition only for light. The results indicated that for any level of radiation there was an optimum leaf-area index, at which crop growth-rate is maximal, and that the value of the optimum index increased as radiation increased. These concepts are presented in a graph in which isopleths for crop growth-rate are drawn for varying levels of radiation and leaf-area index. It is suggested that the data indicate the nature of the interactions in pasture swards and, presumably, also in crop stand and other plant communities.—M.H.

PHASIC DEVELOPMENT

1424† Irgens-Moller, H. **Automatic control of photoperiod.** *Ecology* 1960, **41,** No. 1, 222–3, illus. [Agric. Exp. Sta., Oregon State Coll., Corvallis]

Details are given of the construction of a growth chamber allowing automatic control of photoperiod.—A.M.H.

1425 Muhina, V. A. **The diurnal course of photosynthesis and the translocation of assimilates during the photophase in some short-day and long-day plants.** [Russian] *Trudy Bot. Inst. V.L. Komarova* (*Trudy Inst. bot., Acad. Sci., USSR* (4) *Exp. Bot.*) 1960, Ser. 4, No. 14, 167–87, bibl. 21, English summary.

Among the plants in this study are *Setaria italica* (short-day) and *Hordeum vulgare* (long-day). There is evidence that the intensity of photosynthesis in plants after the photophase has been passed is greater than that in plants which have not passed the photophase. F. Eng. s.—M.H.

1426† Witsch, H. von. Über den Einfluss der Tageslänge auf den Farbstoff- und Aneuringehalt der Blätter von Lang- und Kurztagspflanzen. [**The effect of the length of day on the content of colouring matter and aneurin in the leaves of long- and short-day plants.**] *Z. Bot.* 1959, **47**, No. 1–2, 121–44, bibl. 36, illus. [Techn. Hochsch. München in Weihenstephan, Bavaria]

The leaves of long-day plants (*Trifolium pratense*) grown in short day and of short-day plants (*Panicum miliaceum* and *Setaria italica*) grown in long day had a higher content of aneurin and of colouring matter than the control plants which were grown in the day length which induces them to flower. F. Ger s.—D.B.

REPRODUCTION

1427† Vasil, I. K. **Pollen germination in some Gramineae: *Pennisetum typhoideum*.** *Nature, Lond.* 1960, **187**, No. 4743, 1134–5, bibl. 7. [Bot. Dep., Univ. Delhi]

It is [incorrectly] claimed that this is the first report of successful germination of pollen of Gramineae *in vitro*. The vital role of boron in pollen germination and pollen tube growth is confirmed. [See next abs.]—M.H.

1428† Wiehe, P. O. **Pollen germination in some Gramineae.** *Nature, Lond.* 1961, **189**, No. 4761, 328. [Sugar Ind. Res. Inst., Réduit, Mauritius]

The author draws attention to work recorded in 1930 and 1931 by Glendon Hill in the annual reports of the Sugarcane Research Station, Mauritius, where there is an account of the germination *in vitro* of pollen from varieties of *Saccharum officinarum*.—M.H.

RADIOBIOLOGY

See also Abs. 1376.

1429† Kreybig, T. von. Die Wirkung von Teilbestrahlungen auf einige Leguminosen. [**The effect of partial irradiation of some Leguminosae.**] *Ber. dtsch. bot. Ges.* 1960, **73**, No. 4, 107–14, bibl. 11, illus. [Inst. Angew. Bot., Univ. Tübingen, W. Germany]

After irradiation of parts of *Vicia faba* plants with the lethal dose of 1000–2000 r, the irradiated zones died, but from the non-irradiated parts there was renewed growth ; lateral buds were laid down and the shoots produced took over the role of the irradiated parts. The seed yield was considerably reduced, and irradiation effects persisted in the progeny of partially irradiated plants ; in *Pisum sativum*, irradiation of the roots had no noticeable effect on the root but the seed yield was greatly reduced. When the shoot was irradiated, it continued growth but was considerably weaker than in control plants. More than half of the treated plants died, and, in the remaining individuals, the number of seeds per plant was lower than in control plants.—D.B.

1430 Nishita, H. and others. **Uptake of radioactive fission products by crop plants [a review].** *J. agric. fd Chem.* 1961, **9**, No. 2, 101–6, bibl. 32. [Univ. California, Los Angeles]

TECHNIQUES AND APPARATUS

See also Abs. 1424.

1431 Bringman, M. **A movable equipment for observations, measuring and sampling in field crops.** *K. LantbrHögsk. Ann.* 1960, **26**, 333–8, illus.

An illustrated account is given of a traversing, man-carrying trolley, mounted on a metal framework which supports it above the crop to be examined. The following advantages are claimed for the apparatus : it has no influence on the crop studied ; it is big and strong enough to carry an observer over the crop at a suitable height ; it has a co-ordinate system which makes it possible to return with certainty to any point of the plot studied ; it is easy to make and to handle and is not expensive.—A.G.G.H.

1432† Stocker, O. and Vieweg, G. H. Die Darmstädter Apparatur zur Momentanmessing der Photosynthese unter ökologischen Bedingungen. [**The Darmstadt apparatus for instantaneous measurement of photosynthesis under ecological conditions.**] *Ber. dtsch. bot. Ges.* 1960, **73**, No. 5, 198–208, bibl. 32, illus. [Bot. Inst., Techn. Hochsch. Darmstadt, W. Germany]

1433 Engel, K. H. and Raeuber, A. Ein neues Kulturgefäss zur laufenden Beobachtung unterirdischwachsender Organe (Kartoffeln). [**A new culture receptacle for the continuous observation of underground-growing organs (potatoes).**] *Züchter* 1960, **30**, No. 5, 206–7, bibl. 2, illus. [Inst. PflZücht. Gross-Lüsewitz (D.A.L.) and Agrarmeteorol. ForschSta. Gross-Lüsewitz, E. Germany]

With this apparatus it is possible to study the effect of weather on tuber formation. It consists of an ordinary Mitscherlich vessel on which rests a tripod which supports an opaque plate. The tripod legs are enveloped by an opaque cylindrical sleeve, and both tripod and sleeve are easily removed for observation and measurement of the tubers. The roots and stolons of the potato plant are in the soil in the Mitscherlich vessel, the stem and leaves pass through a hole in the opaque plate. The tubers

develop on the top of the soil, in the air space surrounded by the sleeve. Watering is done through tubes which pass through holes in the top plate. A film camera may be used as an accessory with this apparatus.—D.B.

1434† Cerling, V. V. **[A new quick method for plant diagnosis.]** [Russian] *Vestn. Akad. Nauk SSSR* (*J. Acad. Sci. USSR*) 1960, **30**, No. 8, 81–3, illus.

An apparatus, for use in the field, to determine plant chemical composition is described and illustrated.—M.H.

1435† Henriksen, A. Om bestemmelse af calcium, magnesium, kalium og natrium i plantemateriale. **Determinations of calcium, magnesium, potassium and sodium in plant material.** *Tidsskr. Planteavl* 1960, **64**, No. 3, 530–52, bibl. 8, English summary.

WEEDS AND WEED CONTROL

Where weeds are associated with a crop, see under the crop concerned.

SPECIFIC WEEDS

1436† McWhorter, C. G. **Johnsongrass growth study shows why it is so difficult to control.** *Miss. Fm Res.* 1960, **23**, No. 12, 6–7, illus. [Mississippi Agric. Exp. Sta., Stoneville]

Morphological development in terms of rhizome and seed production of *Sorghum halepense* is reported, together with observations on the effectiveness of dalapon (in 2% solution + 0·5% wetting agent) as a means of control when applied at various stages of growth.—R.H.F.

1437 Anderson, L. E. and others. **Characteristics of Johnsongrass rhizomes.** *Weeds* 1960, **8**, No. 3, 402–6, bibl. 7, illus. [Kansas Agric. Exp. Sta., Manhattan]

1438 Frans, R. E. **Controlling Johnsongrass by fallowing and cropping systems.** *Ark. Fm Res.* 1960, **9**, No. 6, 2, illus. [Main Exp. Sta., Fayetteville, Arkansas]

Fallowing [for a season], in which a cross-discing cultivation was given when *Sorghum halepense* reached a height of 8–12 in., followed by an autumn wheat/fallow or cotton/fallow rotation, was effective in bringing an infestation under control.—R.H.F.

1439† Leasure, J. K. **Some techniques and results on quackgrass with C^{14} labelled dalapon with and without wetting agent.** *Down to Earth* 1961, **16**, No. 4, 20–4, bibl. 11, illus. [Dow Agric. Chem. Res. Centre, Midland, Michigan]

The uptake and translocation of ^{14}C-labelled dalapon within *Agropyron repens* from foliar applications was considerably increased by the addition of up to 0·2% wetting agent Polyglycol 26–2.—R.H.F.

1440 Hocombe, S. D. **Notes on a conference on the control of couch and other grasses in East African plantation crops, particularly with the use of dalapon.** *Pest. Abstr.* (*C*) 1960, **6**, No. 4, 109–16. [Col. Pest. Res. Unit, Arusha, Tanganyika]

1441 Watson, K. A. **Dalapon for spear grass [*Heteropogon contortus*] control.** *News Lett. Minist. Agric. N. Reg. Nigeria* 1960, No. 25, 7–8.

The most effective treatment was 10 lb dowpon/ac applied in 15–20 gal water early in the season, followed by a cultivation 2 weeks later.—R.H.F.

1442 Gast, A. and Grob, H. **Triazines as selective herbicides.** *Pest Technol.* 1960, **3**, No. 3, 68–73, bibl. 2, illus.

It is reported that simazin at 750 g/ha will control the grasses *Apera spicaventi* and *Alopecurus myosuroides*.—R.H.F.

1443 Korven, N. A. **Delayed seeding for wild oats control.** *Proc. 16th N. Cent. Weed Contr. Conf. and 10th W. Canad. Weed Contr. Conf.* 1959, 36. [Exp. Fm, Swift Current, Saskatchewan] [Received May, 1960]

The effect of 4 fallow and 4 sowing treatments on the wild-oat [seed] population in the top 5 in. of a heavy clay soil was studied. Early sowing (1 May) of wheat and barley resulted in a 5-fold increase in the wild-oat seed population. Delayed sowing (23 May) reduced infestation by up to 66%. The standard fallow treatment had a significantly higher final population than other fallow treatments, viz. (a) discing in autumn followed by standard fallow, (b) as (a) with 10 lb propham/ac sprayed in autumn, (c) standard fallow followed by spraying and discing.—A.M.H.

1444 Howden, J. S. and others. **Weeds committee report.** *Rep. Ann. Conf. Manitoba Agronomists* 1959, 35–40. [Received Feb., 1960]

Results of an experiment carried out in 1953–7 on the effect of cultural practices on wild-oat control are reported. Barley sown on 8 June had

a much lower wild-oat population than that sown on 8 May, but the late-sown plots yielded significantly less than the early-sown. Seed rate had little influence on wild-oat incidence in the first year, but thereafter plots sown with 2·5 bu/ac, had fewer wild oats than those sown with 1·25 bu/ac. There was little evidence of an effect of fertilizer on wild-oat control. After the first year, post-sowing rod weeding was extremely effective provided weather and soil were favourable. In tests of various chemicals for weed control in field shelter belts in 1958–9, simazin at 6 and 9 lb/ac gave fair weed control in the first season and complete weed control in the second without apparent tree damage. Dalapon at 20 or 40 lb/ac plus 2,4-D at 1 lb/ac gave 100% weed control in the first year after application but no control in the second year, and severely affected all tree species concerned. Atrazine at 8 lb/ac gave good weed control in the first year with no tree damage. The effects of TCA and dalapon on the morphology, yield and seed quality of Redwood, Raja and Marine flax were investigated. In general, TCA at the recommended rate had no effect on yield but excessive dosages caused slight injury to the flax. It had no effect on oil content, oil quality or seed viability. Dalapon reduced yield slightly even at the recommended rate of 1 lb/ac, but did not affect oil content, quality or seed viability. Dalapon at 3 lb/ac produced serious reductions in yield and oil quality. Suggested rates of avadex and carbyne for trial use in wild-oat control in wheat, barley, flax, sugar-beet, rapeseed, sunflower and peas are listed.—A.M.H.

1445† Department of Agriculture, Canada. **Field husbandry. Weed control research.** *Rep. Minist. Agric. Canada. 1958-9* 1959, 95–6, 99. [Received Jan., 1960]

Eptam at 4 lb active ingredient/ac gave over 90% control of wild oats and green foxtail, without injury to sugar-beet, in tests at Lethbridge, Alberta. At Indian Head, 2, 3, 6-trichlorobenzoic acid at 20 lb/ac gave excellent control of Russian knapweed. A method was developed to induce a dormancy very similar to the natural type in wild-oat seeds. It consisted essentially of a prolonged soaking followed by drying. In the Swift Current area, Saskatchewan, yields and quality of crops were reduced when herbicides replaced all tillage operations on fallow. At Indian Head, wheat on a chemically treated fallow yielded 13·7 bu/ac, while on a standard fallow the yield was 25·4 bu/ac. In extensive tests throughout the Prairie Provinces in 1957–8, the protein content of wheat grown on fallow was usually higher than that of wheat grown on stubble. Addition of N fertilizer generally increased protein content, but added P fertilizer sometimes had an opposite effect. Use of 2,4-D did not adversely affect protein content of wheat. In tests at Lethbridge, use of a mouldboard plough, a one-way disc and a sub-surface cultivator conserved moisture and controlled weeds but the most wind-resistant soil surface was produced by use of the sub-surface cultivator. Spray drift of butyl ester, low volatile ester and amine formulations of 2,4-D on growing sunflowers resulted in distortion of leaves and stems. Effects were clearly discernible at 120 rods. As a result of 1 hr of spraying, with a wind velocity of 9 miles/hr, seed yield was reduced by 42, 38 and 37% for ester, low volatile ester and amine formulations, respectively.—A.M.H.

1446† Steinbauer, G. P. and Grigsby, B. **Dormancy and germination of the docks (*Rumex* spp.).** *Proc. Ass. off. Seed Anal. N. Amer.* 1960, **50**, No. 1, 112–17, bibl. 16. [Michigan State Univ., East Lansing]

The effect was studied of temperature, light and moistening agent on the germination of *Rumex acetosa*, *R. acetosella*, *R. altissimus*, *R. crispus*, *R. mexicanus*, *R. obtusifolius*, *R. orbiculatus* and *R. verticillatus*. The most effective combination of conditions for all species was the use of alternating temperatures (20°C for 16 hr, 30°C for 8 hr), light (8 hr at 30°C) and water. The need for light was more critical at constant temperatures. Both light and temperature requirements were less critical for older seeds. Over 50% viability was maintained for most species by air storage for up to 3 yr. F. s.—R.H.F.

1447 Corns, W. G. **Combined effects of gibberellin and 2,4-D on dormant seeds of stinkweed (*Thlaspi arvense* L.).** *Canad. J. Bot.* 1960, **38**, No. 6, 871–4, bibl. 3, illus. [Univ. Alberta, Edmonton]

Dormant seeds of *Thlaspi arvense* were induced to germinate by the presence of 50 or 500 ppm. GA and/or 2,4-D at 50 different concentrations ranging from 0·00001 to 8000 ppm. a.e. GA at 50 ppm. induced 90% germination within 2 weeks, GA at 500 ppm. induced complete germination within 8 days. Shoot elongation was retarded by $>0{\cdot}02$ ppm. 2,4-D and germination by $>0{\cdot}5$ ppm. 2,4,-D. Concentrations of 2,4-D higher than *c.* 200 ppm. prevented GA at 50 or 500 ppm. from causing any true germination. F.s.—R.B.

1448 Wiese, A. F. and Rea, H. E. **Field bindweed (*Convolvulus arvensis*) control with soil applications of phenoxy herbicides.** *Weeds* 1960, **8**, No. 3, 418–21, bibl. 9. [Texas Agric. Exp. Sta., College Station]

In field studies, 9 phenoxy herbicides and amitrol were sprayed on to the soil at 80 lb/ac. Anhydrous borax was also applied at 2560 lb/ac, and a mixture of 2,4-D and borate at 640 lb/ac. The most effective herbicides were silvex [2-(2,4,5-T)P], followed by 2,4,5-T and 2,4-D, the period of residual toxicity following the same

order (22, 10 and 3 months). Amitrol was ineffective. Anhydrous borax controlled bindweed, but its toxicity persisted for more than 2 years. A glasshouse study showed that the period of residual toxicity of the phenoxy herbicides was reduced by wetting the soil.—J.D.J.

1449 Robinson, E. L. **Growth of witchweed (*Striga asiatica*) as affected by soil types and soil and air temperatures.** *Weeds* 1960, **8**, No. 4, 576–81, bibl. 10, illus. [N. Carolina Agric. Exp. Sta., Raleigh]

1450† Bell, R. S. and Larssen, E. **Experiments with the germination of northern nutgrass [*Cyperus esculentus*] seed.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 45–8, bibl. 2. [Rhode Island Agric. Exp. Sta.]

Laboratory tests were carried out on the effects of temperature and light on germination of *C. esculentus*. Under field conditions, a New York strain germinated and grew vigorously, a Rhode Island strain germinated poorly and a Massachusetts strain was intermediate in response. It was concluded that seed is a potential source of infestation which should not be ignored in nutgrass control. F. s.—A.M.H.

1451† Durfee, J. W. and others. **Control of northern nutgrass [*Cyperus esculentus*] with eptam and atrazine.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 214–16, bibl. 2. [Massachusetts Agric. Exp. Sta., Amherst]

Applications of 20–40 lb eptam/ac incorporated with the soil resulted in excellent control of *C. esculentus*. Recovery was practically nil in the year following the 40 lb/ac treatment. Excellent seasonal control was also obtained at rates of 6 and 10 lb/ac. Atrazine was effective in post-emergence treatments (10–20 lb/ac) and in pre-emergence treatments (4–8 lb/ac) incorporated with the soil. F. s.—A.M.H.

1452† West Scotland Agricultural College. **Bracken control.** *Rep. W. Scot. agric. Coll. 1959-1960* 1960, 27–9.

A re-assessment of previous experiments confirmed that the effects of cutting were longer-lasting than those of bruising. Replicated trials were laid down at 2 locations to compare the effectiveness of 4-chlorophenoxyacetic acid (as weedone brackontrol) at 1 and 2 gal/ac, dalapon (as dowpon) and amino-triazole (as weedazol and weedazol T.L.) at 10 and 20 lb a.e./ac applied either at the end of July or at the end of Aug. An assessment, 1 year later, gave the following percentage kills after spraying at the earlier date and using the higher level of herbicide : weedazol 50%, dalapon 48%, weedazol T.L. 40%, weedone brackontrol 15%. It was considered that a reason for the poor results might be the time of spraying in relation to the development of rhizome frond buds.—R.H.F.

1453† Kramer, M. and Leiderman, L. Observações sôbre experiências em andamento para a eliminação da palmeira indaiá por meios químicos. [**Observations on trials in progress for controlling the palm *Attalea exigua* by chemical methods.**] *Biológico, S. Paulo* 1961, **27**, No. 2, 33–6, illus., English summary.

Attalea exigua is a noxious weed of pastures and fields in São Paulo State, Brazil. In trials near Sorocaba in 1960, one spray treatment, applied to the middle of the plants, of about 125 ml of 2,4,5-T ester, 0·75% a.e., or of a mixture of 2,4-D plus 2,4,5-T, 0·9% a.e., in diesel oil, gave 100% kill of this weed.—E.B.O.

HERBICIDES

1454† Thompson, F. B. **Tolerance of crops and weeds to new chemicals.** *Proc. 13th N.Z. Weed Contr. Conf.* 1960, 71–5, bibl. 2. [Rukuhia Soil Res. Sta., Hamilton, N.Z.]

The logarithmic sprayer is proving useful in the preliminary screening of herbicides. From trials with amiben, fenac, CDAA, CDEA, CDEC, EPTC, trietazine, and simazin (excluding trials with maize), it appears that amiben is the most promising. It gave good selective weed control in chou moellier. In fodder-beet trials some weeds not satisfactorily controlled by CIPC proved very susceptible to amiben. F. s.—M.H.

1455† Houlker, W. M. **Adjuvants as an aid to increasing the efficiency of weedkillers.** *Proc. 13th N.Z. Weed Contr. Conf.* 1960, 52–7, bibl. 7.

Weeds in New Zealand which are susceptible to a particular hormone weed-killer and yet display inexplicable variations in susceptibility include *Ulex europaeus*, *Juncus* spp. and *Leptospermum scoparium*. Results of field trials involving the use of a spreader-sticker with 2,4,5-T on gorse are given. —M.H.

MISCELLANEOUS

1456† Rochecouste, E. and Vaughan, R. E. **Weeds of Mauritius. No. 6. *Argemone mexicana*** (Chardon) *Leafl. 4 Mauritius Sugar Ind. Res. Inst.* 1960, pp. 3, illus.

A botanical description and notes on ecology of *A. mexicana* are given. This weed can be controlled before its emergence by MCPA or 2,4-D at about 1·5–2 lb a.e./ac. Adult plants are generally eradicated by these herbicides at these same rates of application.—E.B.O.

1457† Fertig, S. N. **Preliminary results on the use of herbicides in legume estab-**

lishment in small grains. *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 247–52. [Cornell Univ., Ithaca, New York]

Garry oats were sown on 24 April at 2 bu/ac. On 25 April half of each replicate was sown with Viking birdsfoot trefoil and the other half with Du Puits lucerne, each at 8 lb/ac. Mustard seed at 12 lb/ac was then broadcast over all plots. Treatments included 8 different chemicals in 25 combinations of rates and mixtures. The highest oat yields were from plots sprayed with MCPA or 2,4-D at 0·25 lb/ac or 4(2,4-DB) + MCPA at 1·5 + 0·0875 lb/ac. These treatments and mixtures of 4(2,4-DB) + 2,4-D gave the best weed control. In October the legume stands showed more damage from the MCPA and 2,4-D treatments than from the 1- to 3-lb rates of 4(2,4-DB) amine formulations. The 3 lb rate of 4(2,4-DB) ester caused more damage. In a second experiment CMPP at 1–3 lb/ac and ACP-119 at 2-3 lb/ac gave significantly higher oat yields than other treatments but not higher than the control. The most effective weed control was with CMPP. This caused the most severe legume injury. Least legume damage occurred with sinox P.E.—A.M.H.

1458† Matthews, L. G. **Chemical methods of weed control.** *Bull. 329 N.Z. Dep. Agric.* 1960, pp. 200, illus.

This subject is considered from the following aspects : principles of weed control ; chemical weedkillers and their properties ; control of specific weeds ; weed control in specific areas ; and application of weedkillers. There is a combined index in which both subject and plant names are listed.—M.H.

1459† Anderson, E. G. **A national organization for weed control and some significant results.** *Proc. N.E. Weed Contr. Conf.* [*USA*] 1960, **14**, 7–15, bibl. 16. [Dep. Agric., Ottawa]

The influence of different daylengths on annual and perennial species of *Chenopodium* is summarized. Three main groups are distinguished : (a) annual species flowering most rapidly under daylengths of 6–8 hr and least rapidly in continuous light ; (b) annual species flowering most rapidly under continuous light ; (c) perennial species [daylength requirements not given]. Extracts of ground leaves and stems of Russian knapweed [*Centaurea repens*] inhibited germination and radicle development in lucerne, alsike clover [*Trifolium hybridum*] and turnip seeds but had little effect on germination of barley and perennial ryegrass. Spraying with an aqueous solution of 4000 ppm. amitrol caused an increase in respiration rate and a decrease in rate of photosynthesis in wheat seedlings. Wild oats. It was shown that the 4 sspp. *vilis*, *glabrata*, *intermedia* and *pilosissima* had different degrees of seed dormancy. Sspp. *vilis and glabrata*, with grey seed hulls, had germination rates of 45 and 42%, respectively, while *intermedia* and *pilosissima*, with brown seed hulls, had germinations as low as 11%. The most successful cultural control method was to delay sowing until one or two crops of wild oats could be cultivated out [sic] and then to sow an early-maturing barley variety at a slightly heavier seed rate than usual. Autumn tillage of stubble land was more effective than spring tillage in reducing wild oats in barley. Studies on dormancy of wild-oat seeds and the presence of a germination inhibitor in the hull are mentioned.—A.M.H.

SURVEYS AND LAND USE

SURVEYS

1460† FAO **FAO Mediterranean development project. The integrated development of Mediterranean agriculture and forestry in relation to economic growth. A study and proposals for action.** *FAO* 1959, pp. 232. [Received Feb. 1961]

This report results from studies and consultations among governments over the last few years on problems of agriculture, forestry and general economic development in the countries bordering the Mediterranean, together with Portugal, Jordan and Iraq which form part of the same natural area. The chapter heads are : the setting ; the approach to self-sustained growth and balanced land use ; increasing production while improving land use ; the programmes and their execution. Special investigations were made in Greece, Turkey, Iraq, United Arab Republic (Syrian region), Lebanon, Israel, Tunisia, Morocco, Spain and Yugoslavia.—E.B.O.

1461 Mitchell, C. W. and Naylor, P. E. **Investigations into the soils and agriculture of the middle Diyālá region of eastern Iraq.** *Geogr. J.* 1960, **126**, No. 4, 469–75, bibl. 13, illus.

See also *Fld Crop Abstr.* 13 : 1986.

1462† Langdale-Brown, I. 3. **The vegetation of the West Nile, Acholi and Lango districts of the Northern Province of Uganda. 4. The vegetation of the Western Province of Uganda. 6. The vegetation of Uganda (excluding Karamoja).** *Mems Res. Div. Dept. Agric.*

Uganda Protect. Ser. 2. Vegetation 1960, Nos. 3, 4, 6, pp. 106, 111, 45, bibl. 62, 91, 45, maps 9, 10, 13.

For Nos. 1 and 2 of this survey, see *Fld Crop Abstr.* 13 : 1474 and 1475.—C.L.S.

1463 Shafi, M. **Measurement of agricultural efficiency in Uttar Pradesh.** *Econ. Geogr.* 1960, **36**, No. 4, 296–305.

1464† Brunori, P. G. La provincia Morona-Santiago nell'oriente equatoriano, con particolare riguardo alle vallate Upano-Namangoza e Zamora. [**The province of Morona-Santiago in eastern Ecuador, with particular regard to the Upano-Namangoza and Zamora valleys.**] *Riv. Agric. subtrop.* 1960, **54**, No. 1–3, 54–75, bibl. 6, illus., English summary. [Quito, Ecuador]

Information is given on the climate, vegetation, agriculture and animal husbandry in that region.—E.B.O.

1465† Smith, C. T. **Aspects of agriculture and settlement in Peru.** *Geogr. J.* 1960, **126**, No. 4, 397–412, bibl. 22, illus.

LAND USE

1466 Jacques-Félix, H. and Chezeau, R. Sols et groupements végétaux de la zone littorale de Guinée dans leurs rapports avec la riziculture. 2. La région du Koba. [**Soils and plant communities of the coastal zone of French Guinea and their relationship with rice cultivation. 2. Koba region.**] *Agron. trop., Paris* 1960, **15**, No. 6, 609–23, bibl. 1, illus., English and Spanish summaries.

Several plant communities of the Koba region (situated between the estuaries of the Konkouré and the Fatala) are characteristic of particular soils. The halophilous communities of *Paspalum vaginatum*, *Philoxerus vermiculatus* and *Sesuvium portulacoides* are indicators of good agricultural soils which are, however, on the threshold of NaCl toxicity and are unsuitable for mechanized cultivation. The hydrophilous communities of *Eleocharis mutata* and *Scirpus littoralis* indicate soils suitable for mechanized rice cultivation. [See also *Fld Crop Abstr.* 14 : 167.]—E.B.O.

1467† Rocchetti, G. Su alcuni aspetti della pedogenesi e dell'irrigazione nelle zone aride. [**Some aspects of soil origin and irrigation in arid zones.**] *Riv. Agric. subtrop.* 1960, **54**, No. 10–12, 799–824, bibl. 54, English summary. [Ist. Agron. Oltremare, Firenze, Italy]

This is a review.—E.B.O.

FARMING SYSTEMS AND PRACTICES

1468 Naylor, P. E. **Farming organization in central Iraq.** *Emp. J. exp. Agric.* 1961, **29**, No. 113, 19–34, illus. [Hunting Tech. Serv., Boreham Wood, Herts]

1469† Beguin, H. La mise en valeur agricole du sud-est du Kasai. Essai de géographie agricole et de géographie agraire et ses possibilités d'applications pratiques. [**The improvement of agriculture in S.E. Kasai (Congo). An essay on agricultural and agrarian geography and possibilities for practical applications.**] *Série sci. 88 INÉAC* 1960, pp. 289, bibl. 130, illus., 25 × 16 cm, Bruxelles. [Div. Agrol. INÉAC, Yangambi, Congo]

This is mainly a study of land tenure and farming systems in the savanna region crossed by the Rivers Lulua and Luba between 6° and 7°S. lat. at an average altitude of 750 m.—E.B.O.

1470 Department of Agriculture, Tanganyika. **Intercropping.** *Rep. Dep. Agric. Tanganyika 1959*, 1960, 11.

When early-sown groundnuts were intercropped with late-planted cassava or castor, the yield of groundnuts was not seriously affected ; but the yields of cassava or castor were reduced to less than one-fifth of what they produced when grown alone. When maize and sweet-potatoes were planted together at the same time, the maize was not affected, but the yield of sweet-potatoes was reduced to about one-fifth. Similarly with maize and cotton, the yield of maize was maintained at the expense of the cotton.—J.D.J.

1471 Leggett, G. E. and Nelson, W. L. **Wheat production as influenced by cropping sequence and nitrogen fertilization in the 10 to 15 inch rainfall area of eastern Washington.** *Bull. 608 Washington agric. Exp. Sta.* 1960, pp. 16.

Crop records were kept at 3 centres for 5 successive years to compare wheat grown every year (N at 4 levels) with wheat and fallow in alternate years (N at 5 levels). Selecting the optimum N level in each case, the yield comparisons at the 3 centres on a 2-year basis were 2 × 13 bu with 24 bu, 2 × 23 with 46, and 2 × 29 with 46. But at the first of these centres wheat every year averaging 13 bu/ac was judged to be uneconomic. After applications of N the protein content of the wheat was increased, and nitrate-N was carried forward in the soil to the next season.—J.D.J.

1472 Baldoni, R. Erbai nell'agricoltura italiana. [**Short-duration fodder crops in Italian agriculture.**] *Sementi elette* 1960, **6,** No. 5, 44–54, English and German summaries. [Ist. Agron. Univ. Padova, Italy]

The importance of short-duration fodder crops is increasing in Italy where their cultivation is often the only way of increasing the number of cattle. Information is given on the following principal plants, many of which are used in mixtures : maize, oats, tick bean (*Vicia faba minor*), vetch (*Vicia sativa, V. villosa* and *V. pannonica*), sorghum, cowpea (*Vigna sinensis*), peas and rape. —E.B.O.

1473† Singh, K. **Value of bush, grass or legume fallow in Ghana.** *J. Sci. Fd Agric.* 1961, **12,** No. 2, 160–8, bibl. 26. [Min. Fd Agric., Accra, Ghana]

1474 Rogačev, N. and Karpovič, I. [**Cropped fallows in the Taïga zone.**] [Russian] *Sel'hoz. Sibiri* (*Agric. Siberia*) 1960, **5,** No. 12, 24–7. [Narym State Select. Sta.]

1475 Department of Agriculture, Tanganyika. [**Soil fertility : rotation experiments at Ilonga.**] *Rep. Dep. Agric. Tanganyika 1959* 1960, 5.

A test crop of maize yielded as much after continuous cultivation as it did after 1, 2 or 3 years' fallowing with a bastard fallow, planted *Tridax*, elephant grass, or pigeon pea. In another experiment, to compare cotton, maize and sorghum grown in rotation, with the same crops grown continuously, yields in the fourth year of cropping did not suggest any difference in trend.—J.D.J.

1476† Baldanzi, G. Efeitos da queimada sôbre a fertilidade do solo. [**Effects of fire on soil fertility.**] *Bol. téc. Inst. agron. Sul* 1959, No. 25, pp. 61, bibl. 250, English summary. [Esta. Exp. Curitiba, Paraná, Brazil] [Received Feb., 1961]

In an experimental study, burning the natural vegetation significantly increased the subsequent yields of wheat, potato, flax and beans compared with ploughing-in such vegetation [see also *Fld Crop Abstr.* 12 : 2044]. The results of the investigations described in this paper indicated that burning the vegetation improves soil fertility primarily because it increases significantly the N content of the soil.—E.B.O.

1477 Burnackiĭ, D. P. and Jarovenko, V. V. [**The effect of depth of ploughing normal black-earth on soil fertility and crop yield.**] [Russian] *Počvovedenie* (*Pedology, Moscow*) 1961, No. 3, 83–9, bibl. 9, English summary.

1478 Stout, B. A. and others. **Effect of soil compaction on seedling emergence under simulated field conditions.** *Agric. Engng, St. Joseph, Mich.* 1961, **42,** No. 2, 68–71 and 87, bibl. 15. [Michigan Agric. Exp. Sta., East Lansing]

Laboratory experiments conducted with maize, sugar-beet and beans [field] showed that soil-moisture content greatly influenced the effect of soil compaction on seedling emergence. Compacting, at up to 10 lb per sq. in., at the same level as the seed improved emergence when adequate moisture was available below the seed. When moisture was limiting, compacting at seed level or surface level was of no benefit.—R.H.F.

1479 Peat, J. E. and Brown, K. J. **Effect of management on increasing crop yields in the Lake Province of Tanganyika.** *E. Afr. agric. for. J.* 1960, **26,** No. 2, 103–8, bibl. 1, illus. [Empire Cotton Growing Corporation, Ukiriguru, Tanganyika]

On the hill sand at Ukiriguru, ties at 8-ft intervals across the furrows between 5-ft ridges have, over a period of 11 years, increased yields of seed cotton by 151 lb/ac/yr, and bulrush millet by 95 lb, compared with the traditional plain ridges. On the black-clay valley-bottom soil at Ukiriguru, cultivation on the flat gave the best yields of sorghum and cotton, and neither 5-ft nor 20-ft ridges were successful. At Lubaga, near Shinyanga, where cultivation on the flat is usual, tied ridges gave much larger yields of cotton and sorghum on both black loam and hard-pan soils. Ridges on the hill sand at Ukiriguru are normally split annually and remade over the old furrow so as to bury all weeds. An attempt to save labour by renovating old ridges resulted in troublesome weediness and lower yields of cotton. Similarly, attempts to save labour by delaying weeding resulted in lower yields of cotton on the hill sand, and of sorghum on the black clay. The weed *Tridax repens* appeared to be largely responsible for reduced yields of cotton. Time-of-sowing trials at Ukiriguru covering the range Nov.–March showed that yields of cotton declined rapidly if sowing was delayed beyond early Jan. —J.D.J.

1480 Waggoner, P. E. and others. **Plastic mulching, principles and benefits.** *Bull. 634 Connecticut agric. Exp. Sta.* 1960, pp. 44, bibl. 19, illus.

1481 Jannaccone, A. Basi agronomiche per la trasformazione irrigua della Piana di Catania e primi risultati di indagini sperimentali. [**Agronomical bases for the development of irrigation in the Catania Plain (Sicily) and first results from investigations.**] *Tecnica agric.* 1960, **12,** No. 4, 359–74, bibl. 2, illus. [Ist. Agron. Gen. Univ. Catania]

1482 Sarkisov, A. A. **[Irrigation of the Hunger Steppe.]** [Russian] *Hlopkovodstvo (Cott. Prod.)* 1961, **11**, No. 3, 1–11, illus.

This Steppe lies approx. 70°E., 48°N.—M.H.

1483† Orr, A. E. Informe al Gobierno de Chile sobre economía del riego. **[Report to the Government of Chile on the economy of irrigation.]** *Rep. 1022 FAO/ETAP* 1959, pp. 18. [Received Feb. 1961]

The problems of irrigation in that country are examined and recommendations made for their solution.—E.B.O.

1484† Statens Forsøgsvirksomhed i Plantekultur, Denmark. Fastliggende forsøg med vanding. **[Long-term irrigation trials.]** *Medd. 651 Stat. Forsøgsvirk. Plantekult.* 1960, pp. 4.

In trials in Denmark during 1950–5, rotations of oats, rye, swedes, barley with undersown clover/grass, and 2 years' clover/grass were grown with adequate manuring, both with and without irrigation. The rotation trials were continued during 1956–9, with potatoes replacing the second year of the ley and [fodder-]beet replacing swedes. Irrigation increased yields as follows : oats by 4·3 – 38·7 hkg grain and 1·6 – 43·6 hkg straw/ha ; rye by 0·2 – 34·7 hkg grain and 0 – 32·4 hkg straw/ha ; barley by 0·9 – 36 ·7 hkg grain and 2·1 – 26·6 hkg straw/ha ; first year of ley by 18·9 – 96·7 hkg dry matter and 3·26 – 18·31 hkg crude protein/ha ; second year of ley by 14·3 – 32·4 hkg dry matter and 1·13 – 4·7 hkg crude protein/ha ; potatoes by −10 to +148 hkg/ha; swedes by −162 to +257 hkg roots/ha and by −14 to +26 hkg tops/ha ; beet by 4 to 503 hkg roots/ha and −17 to +162 hkg tops/ha. Irrigation water is recommended for crops, except root crops, when half of the available soil moisture has been used up ; 30–60 mm irrigation water for autumn-sown crops and 25–40 mm for spring-sown crops, the quantity depending on soil type. Root crops usually do not need irrigating until a closed stand is obtained.—R.B.

1485 Olson, H. M. and Kapusta, G. **Irrigated vs. dryland crop yields. Williston Branch Station data 1955-59.** *N. Dak. Fm Res.* 1960, **21**, No. 3, 22–4.

Yields of wheat, barley, oats, potatoes and silage maize grown under dryland and under irrigated conditions in 1955–9 are compared. All dryland plots, except maize, were on land fallowed the previous year. Irrigated plots were on land which had previously grown lucerne, or maize after lucerne. All the crops yielded more than twice as much when irrigated as when grown under dryland conditions. On a basis of production per acre of crop land required, the ratio of irrigated to dryland production was more than 4 : 1.—A.M.H.

1486 Kick, H. and Hellwig, D. Vegetations- und Feldversuche zur düngenden Beregnung. **[Pot and field experiments on spray irrigation with fertilizer solutions.]** *Z. Acker- u. PflBau* 1960, **111**, No. 2, 151–78, bibl. 39, English summary. [AgrikChem. Inst., Univ. Bonn, W. Germany]

In field experiments using potatoes and sugarbeet and in pot experiments using barley, the application of fertilizers through sprinkler irrigation, given in amounts corresponding to the known course of uptake of nutrients, had no plant-physiological advantage. The method could be adopted if advantageous from the farm-management aspect so long as it was applied in early stages of growth. F. Ger. s.—D.B.

1487 Kreeb, K. Die Bodenversalzung als störender Faktor bei Feldversuchen und ihre Bedeutung für Keimung, Wachstum und Ertrag. **[Soil salinity as a disturbing factor in field trials and its importance for germination, growth and yield.]** *Ber. dtsch. bot. Ges.* 1959, **72**, No. 3, 123–37, bibl. 18, illus. [Bot. Inst., Coll. Agric., Abu Ghraib, Iraq]

During irrigation experiments in plots on the flood plain of the Euphrates/Tigris, a striking unevenness in development of barley plants was observed within the same plot (28 m²). Three to four months after germination 5 conditions of stand could be identified in juxta-position within one plot. These conditions followed a gradation from normal development with dense stands and flowering heads to the condition of no growth at all. With the aid of quadrats, these zones were charted in 16 plots. Water supply, soil structure and soil nutrients were similar for all plots but analysis of soil samples showed vertical and horizontal fluctuations in salt content, chiefly NaCl. This experience was confirmed in germination trials and coleoptile-elongation trials with barley (Trabot), wheat (Bindschabiya), berseem, and maize (Golden Corn). For 100% germination after 7 days, the limits of soil salinity for these crops were, respectively, 1·6, 0·9, 0·1 and 1·6% ; and for good growth the salinities these crops tolerate are, respectively, 0·6, 0·3, 0·3 and 0·6%. The meliorating effect of N fertilization on saline soils in improving crop yields is discussed, using barley (Murakisch), potato (Bintje) and *Phaseolus mungo* (green gram) as examples.—D.B.

1488† Cooper, D. J. and Heeney, H. B. **Note on a precision plot irrigator for use in irrigation studies.** *Canad. J. Pl. Sci.* 1960, **40**, No. 4, 745–9, bibl. 5, illus. [Canada Dep. Agric. Cent. Exp. Fm, Ottawa, Ontario]

1489 Hopfen, H. J. **Farm implements for arid and tropical regions.** *Agric. Develop. Pap. 67 FAO* 1960, pp. 157, bibl. 57, illus.

This paper deals with hand-powered and

animal-powered implements suitable for farms having sufficient manual labour, but 1 or 2 light draught animals only. It gives details on dry-farming tools, rice-growing implements and those used for row-crop planting in tropical rain-fed areas. It is thought that the use of such implements would contribute to a gradual transformation of shifting-cultivation practices and subsistence farming towards more stable and permanent forms of agriculture and soil conservation.—E.B.O.

SOIL AND WATER CONSERVATION

1490† FAO. **Soil erosion by wind and measures for its control on agricultural lands.** *Agric. Develop. Pap. 71 FAO* 1960, pp. 96, bibl. 152, illus.

Major areas of occurrence of and damage caused by wind erosion of soils are briefly described as an indication of the serious nature of the problem in many agricultural areas. The process of soil erosion, its effect on the soil, and the dominant soil and land surface conditions relating to soil erodibility, are discussed in some detail since they are the basis for control measures. The chapter entitled "Wind erosion control measures" describes those which have been successfully developed in North America, Australia and elsewhere. Particular attention is devoted to the part that improved tillage and cultural practices play in control of soil erosion by wind in dry-farming areas. Emphasis is also given to special problems, including dune-and-drift-stabilization and emergency measures to stop wind erosion once it begins on cultivated lands. Finally, the problem of soil erosion by wind in lesser developed countries, particularly in the semi-arid tropics, is treated in some detail, and recommendations on control measures are made. F. foreword.—E.B.O.

1491† Nixon, P. R. and Schwab, G. O. **Water yield prediction in southern Iowa based on watershed characteristics.** *Iowa State J. Sci.* 1961, **35**, No. 3, 331–42, bibl. 13.

Factors based on the 5 characteristics, climate, soil, land slope, land use, and practices of management and conservation were used to develop an empirical formula to predict the amount of run-off per unit area from watersheds in southern Iowa. When compared with measured run-off from 5 watersheds the estimated figure was correct to within 12%.—R.H.F.

1492† Harrold, L. L. and Roberts, R. L., Jr. **Winter runoff from snow and frozen ground.** *Quart. Bull. Mich. agric. Exp. Sta.* 1960, **43**, No. 1, 154–69, illus.

An interim report is made on observations, covering a period of 6 years, on 2 watersheds of 2 acres each, on which the following vegetation covers were used : rye and maize stalks ; rye and maize stubble ; lucerne and bromegrass [*Bromus inermis*] ; lucerne and bromegrass and oat stubble ; lucerne. Difficulties arise in the interpretation of the data in view of possibly unkown and hence unmeasured factors, lack of precision of recording instruments, and interaction of type of cover with degree of soil freezing.—R.H.F.

1493 Fenster, C. R. **Stubble mulch controls runoff.** *Nebraska Exp. Sta. Quart.* 1960, **6**, No. 4, 3–4, illus. [Box Butte Exp. Sta., Alliance]

Preliminary results are reported from run-off plots situated on a 4% slope carrying a wheat/fallow rotation in which the fallow is either stubble-mulched or left bare. During the summer of 1959, run-off (in inches) was as follows : (1) fallow plots ; stubble-mulched 0·08, bare 1·37 ; (2) wheat plots ; stubble-mulched 1·26, bare 2·95. The amount of soil lost for the same period was, in lb/ac : (1) fallow plots ; stubble-mulched 882, bare 6783 ; (2) wheat plots ; stubble-mulched 1492, bare 12,630.—R.H.F.

1494 Meyer, L. D. and Mannering, J. V. **Minimum tillage for corn : its effect on infiltration and erosion.** *Agric. Engng, St. Joseph, Mich.* 1961, **42**, No. 2, 72–5 and 86–7, bibl. 16, illus. [USDA, Lafayette, Indiana]

Minimum tillage (i.e. no discing and harrowing after ploughing) with and without subsequent cultivation was compared with conventional tillage with cultivation in trials in a silty loam soil of 5% slope in which maize was the first crop after a 2-yr lucerne/cocksfoot ley. Simulated rainfall was applied shortly after sowing, after the first cultivation, and after harvest, at an intensity of approx. 2·6 in./hr. The results showed that minimum tillage with cultivation significantly increased infiltration rate and reduced soil loss. In addition, cultivation itself had a similar effect compared with no cultivation.—R.H.F.

1495† Walker, P. and Lillard, J. H. **Conservation studies. Land forming improves drainage and reduces labor.** *Res. Rep. Va agric. Exp. Sta. 1957-9* 1960, 42–3, illus. [Received March, 1960]

Experiments in the Coastal Plain and Piedmont areas of Virginia showed that removing

surface depressions by smoothing resulted in more than 60% reduction in the annual labour required for field drainage. The studies also indicated that surface smoothing may lower the internal soil-drainage requirements and permit greater distances between field drainage ditches.—A.M.H.

1496† Tewkesbury, A. R. **Soil erosion and soil conservation in northern New South Wales.** *J. Soil Conserv. N.S.W.* 1961, **17**, No. 1, 23–30, illus.

Soil conservation problems of the Gwydir Soil Conservation District, which embraces some 12,000 sq. miles in northern New South Wales, are described. Two regions with markedly different erosion patterns can be distinguished. In both regions mechanical measures have been successful in bringing erosion under control and returning land to productivity. In the tablelands area, pasture improvement has done much to improve cover and soil fertility, and reduce run-off, but control of major gullying, which is a feature of this region, requires the use of machinery. In the wheat-farming areas of the north-west slopes, mechanical measures are necessary to reclaim eroded cultivation and grazing country.—J.D.

AGRO-METEOROLOGY AND CLIMATOLOGY

See also Abs. 1040.

1497 Bennett, M. K. **A world map of food-crop climates.** *Food Res. Inst. Studies* 1960, **1**, No. 3, 285–95, bibl. 17, 2 maps.

The climates described and mapped are based on their relative hospitality to food-crop production. Two maps are presented, one (black and white) distinguishing 3 non-food-crop and 6 food-crop zones and the other (in colour) subdividing the food-crop zones into 3 annual rainfall regimes. The problem involved in fixing these rainfall limits is discussed. Relative areas are tabulated of the 30·7 million sq. miles (54%) of the earth's land surface suitable for food-crop production; the largest single area classified is that of the moist tropics (40–80 in. rainfall/yr) occupying 5·34 million sq. miles.—R.H.F.

1498† Garnier, B. J. **Delimiting the humid tropics.** *ICSU Review* 1960, **2**, No. 4, 210–18, bibl. 11, maps 1.

The humid tropics are defined as those areas of the earth where (a) the mean monthly temperature equals or exceeds 68°F (20°C) for at least 8 months of the year; (b) vapour pressure and relative humidity average at least 20 mb and 65%, respectively, each month; (c) the mean annual rainfall equals or exceeds 40 in. (1000 mm), of which 3 in. (75 mm) or more falls each month for at least 6 months. A map showing these areas is given.—R.B.

1499† Schlichting, E. and Thran, P. Bodenkundliche und klimatische Grundlagen des Landbaues in Zentraleuropa. [**Pedological and climatic bases for crop cultivation in Central Europe.**] *SchrReihe landw. Fak. Kiel* 1960, No. 25, 35–75, bibl. 60, 7 maps.

While the data cover almost the whole of Europe, the findings have been directed more especially to countries of the European Common Market (France, Belgium, Luxembourg, Italy, the Netherlands and W. Germany) and the crops which they are best suited to grow, according to their combination of soil and climate. The first part deals exclusively with soil types. The second part considers the basic elements of climate, their fluctuations and distribution (in time and space) and the relationship between climate and cropping. The third part unites these 2 aspects of the environment for production of a cropping scheme.—D.B.

1500 Brunori, P. G. Considerazioni sui dati climatici raccolti a Pedrinhas (S. Paolo-Brasile). [**Observations on climatic data collected at Pedrinhas (São Paulo, Brazil).**] *Riv. Agric. subtrop.* 1959, **53**, No. 10–12, 455–63, bibl. 5. [Received April, 1961]

1501† Arkley, R. J. and Ulrich, R. **Climatic limitations on plant growth evaluated by balancing soil moisture against evaporation and transpiration.** *Calif. Agric.* 1961, **15**, No. 1, 4–6, illus.

1502† Department of Agriculture, Canada. **Agricultural meteorology.** *Rep. Minist. Agric. Canad. 1958-9* 1959, 93–5. [Received Jan., 1960]

Evidence was obtained which suggested that a protective layer of snow enabled lucerne plants to recover from damage caused by a previous cold spell. In tests at Ottawa, a soil-moisture-budget technique, in which the potential evaporation rate was modulated to compensate for soil dryness and increasing depths of crop roots, was comparable to conventional moisture-block methods in estimating soil moisture under a grass turf. An atmometer consisting essentially of a thin black alundum disc held in a metal cup and fed water by

gravity was tested for 2 yr. It appeared to have all the advantages of the black Bellani plate atmometer but none of its weaknesses. The apparatus withstood up to 7 Fahrenheit degrees of frost.—A.M.H.

1503 VAN DER PAAUW, F. Ritmische opbrengstschommelingen en hun oorzaak. [**Rhythmic fluctuations in crop yields and their cause.**] *Landbouwk. Tijdschr., Wageningen* 1961, **73,** No. 1, 22–30, bibl. 4, English summary.

Rhythmic fluctuations in crop yield were considered to be caused by a cumulative influence of weather on soil fertility. The occurrence of approximately equal alternating periods of different average rainfall was demonstrated. F. Eng. s. —R.B.

1504† EICHMEIER, A. H. and BATEN, W. D. **Rainfall probabilities during the crop season in southern lower Michigan.** *Quart. Bull. Mich. agric. Exp. Sta.* 1960, **43,** No. 2, 394–7.

Three tables are presented giving the probabilities of rain (0·01 in. or more) on the 1st, 2nd or 3rd days following specified days between 1 April and 30 Sept. The data are based upon 91-yr-old records at East Lansing.—R.H.F.

1505 BENNETT, M. K. **Food crops and the isoline of ninety frost-free days in the United States.** *Fd Res. Inst. Studies* 1960, **1,** No. 1, 32–48, bibl. 9.

1506 FRITSCHEN, L. J. and SHAW, R. H. **The effect of plastic mulch on the microclimate and plant development.**. *Iowa State J. Sci.* 1960, **35,** No. 1, 59–72, bibl. 12. [Agron. Dep., Iowa State Univ., Ames]

Maize was the test crop used to compare the micro-climate, in terms of soil temperature, air temperature and radiation, in the presence or absence of a black plastic surface mulch. At 6 and 10 mm below the ground level of mulch plots soil temperatures were higher, were subject to less diurnal variation, and reached their daily maximum 2 hr later than those of natural plots. Little effect on air temperature was noted. Differences observed in the growth of the maize from mulched plots included more rings of brace roots, a less well developed rooting system, a lower maximum height and earlier silking. The mulched maize yielded 123·3 bu shelled maize/ac and 12,594 lb dry weight compared with 114 bu/ac and 11,459 lb from the unmulched plots. [Statistical significance not stated.]—R.H.F.

1507 SCHULTZ, H. B. and KELLY, C. F. **Studies on wind protection efficiency of slatted fence windbreakers.** *Calif. Agric.* 1960, **14,** No. 4, 3 and 11, illus. [Univ. California, Davis]

1508† CARDER, A. C. **Atmometer assemblies, a comparison.** *Canad. J. Pl. Sci.* 1960, **40,** No. 4, 700–6, bibl. 12, illus. [Canada Dep. Agric. Exp. Fm, Beaverlodge, Alberta]

MISCELLANEOUS

1509† LYNCH, P. B. **Conduct of field experiments.** *Bull. No. 399 N.Z. Dep. Agric.* 1960, pp. 155, bibl. 3, illus.

Some basic concepts and general rules to follow in conducting field experiments are outlined, together with statistical considerations, details of field technique and preparation of the data for publication. In the appendices there is information on amounts of seed or fertilizer to drill, calculation of fertilizer and seed weights, conversion factors for use with a fertilizer weight table, fertilizers and herbicides used in the trials.—M.H.

1510† VERVELDE, G. J. Enkele gedachten over de kosten van proefvelden. [**Some thoughts on the cost of experimental plots.**] *Landbouwk. Tijdschr., Wageningen* 1960, **72,** No. 20, 830–7, bibl. 3.

The cost of agricultural experimentation is reviewed from technical and statistical standpoints. It was considered that costs incurred in preparation and lay-out of experiments in order to facilitate statistical treatment are always justified. A tendency was noted for research workers and research institutes to give preference to the less expensive type of trial.—R.B.

1511 DUNCAN, D. A. and BARRETT, P. E. **A summary of field crop yields in a number of localities in Canada.** *Publ. Res. Br. Canada Dep. Agric.* 1960, pp. 32, mimeo.

1512† KULTIASOV, M. V. **The organisation of the investigation and introduction of plants of the natural flora in the botanic gardens of the USSR.** *Pl. Introd. News Lett.* 1961, No. 9, 6–10.

1513† WELLINGTON, P. S. **Biological aspects of seed storage.** *Pl. Path.* 1961, **10,** No. 1, 39–41, bibl. 1. [Chief Officer, Official Seed Test. Sta., Cambridge]

1514 HYDE, H. A. and WILLIAMS, D. A. **Atmospheric pollen and spores as causes**

of allergic disease : hay-fever, asthma and the aerospora. *Advanc. Sci.* 1961, **17**, No. 70, 525–33, bibl. 18.

As distinct from grasses, the only cereal which causes hay-fever is sorghum (in USA). —C.L.S.

REPORTS

1515 **Great Britain.** Report of the Seventh Commonwealth Entomological Conference 6–15 July 1960. London, 1960, pp. 399.

Appendix V of this report (pp. 198–399), which reviews work in economic entomology in the British Commonwealth, 1954–9, is largely concerned with crop pests and their control.—A.G.G.H.

1516 **Great Britain.** Report of the West of Scotland Agricultural College 1959–1960. Auchincruive, Ayr, 1960, pp. 91.

See Abstracts 1305, 1452, 1550.

1517 **Great Britain.** Pea-growing Research Organization Ltd. Annual Report 1959. Yaxley, Peterborough, 1960, pp. 23, 1s. 6d.

See Abstract 1222.

1518 **Great Britain.** Potato Marketing Board. Report on the operation of the Potato Marketing Scheme, year ended 30th June 1960. London, 1960, pp. 83, illus.

During 1959/60, the Board conducted an enquiry into the causes of damaged potatoes (pp. 15–16). It also assisted in a survey of all aspects of main-crop production in 1958 (p. 16). —C.L.S.

1519† **Netherlands.** Instituut voor Biologisch en Scheikundig Onderzoek van Landbouwgewassen, Wageningen. Jaarboek 1960. [Institute for Biological and Chemical Research on Field Crops and Herbage, Wageningen. Yearbook 1960.] 1960, pp. 209, illus.

Summaries of all the papers contained in the current Yearbook, together with explanations of the tables and text-figures, have been translated into Esperanto by Dr. G. F. Makkink and are available as a separate 41-page booklet (*Versl.* 18, 1960 of the above Institute). *See Abstracts 1194, 1225, 1271, 1316, 1317.*—R.B.

1520 **Uganda.** Annual Report of the Department of Agriculture 1959. Entebbe, 1960, pp. 57.

See Abstract 1360.

1521 **Uganda.** Empire Cotton Growing Corporation. Progress Reports from Experiment Stations. Season 1959–60. London, 1960, pp. 45.

See Abstracts 1345, 1369, 1371.

1522 **Tanganyika.** Annual Report of the Department of Agriculture, 1959. Pt 2 (Research). Dar-es-Salaam, 1960, pp. 25.

See Abstracts 1137, 1151, 1407, 1470, 1475.

1523 **Kenya.** Colony and Protectorate of Kenya, Department of Agriculture, Annual Report for 1959. Vol. 2. Record of Investigations. Nairobi, 1961, pp. 174. [Received April, 1961]

See Abstract 1041.

1524† **Canada.** Report of the Minister of Agriculture for the year ended March 31, 1959. Ottawa, 1959, pp. 158. [Received Jan., 1960]

See Abstracts 1048, 1057, 1101, 1304, 1382, 1445, 1502.

1525 **Jamaica.** Ministry of Agriculture and Lands. Investigations 1956–7. Bulletin 57 (N.S.). Kingston, 1960, pp. 139.

See Abstract 1150.

1526 **Seychelles.** Annual Report of the Department of Agriculture for the year 1959. Victoria-Mahé, [n.d.], pp. 34. [Received Feb., 1961]

See Abstract 1152.

1527† **USA.** Research Report of the Virginia Agricultural Experiment Station for the period July 1, 1957 to June 30, 1959. Blacksburg, 1960, pp. 290, illus.

See Abstracts 1099, 1201, 1215, 1495.

BOOKS

1528 Nye, P. H. and Greenland, D. J. **The soil under shifting cultivation.** *Tech. Comm. 51 Commonw. Bur. Soils.* 1960, pp. 162, bibl. 339, illus., 22 × 14 cm, Farnham Royal : Commonwealth Agricultural Bureaux, 20s.

This is a comprehensive account of a farming system which is usually damned, but for which there is much to be said in its favour. The authors aim at a quantitative treatment of the subject, as being the surest way of evaluating the many assertions about the effect of this or that factor on the fertility of the soil.—A.G.G.H.

1529† Polunin, N. **Introduction to plant geography and some related sciences.** 1960, pp. 659, bibls at end of chapters, illus., maps, London : Longmans Press Ltd., 60s.

This is a plum pudding of a book ; it weighs 2 lb 13 oz which is too much for convenient reading in bed. But it is surprisingly small for a book with so wide a scope. The chapter headings show how much ground is covered : the various groups of plants, evolutionary development, crop plants and weeds, successions and climaxes, vegetational types of temperate regions, polar regions, tropical lands, fresh waters and seas ; these are some of them. There are many well chosen illustrations, and many maps, even of the distribution of major farm crops, and references for further study are given at the end of each chapter. Professor Polunin has done outstanding work in arctic ecology, and this is reflected in the excellent chapter on the vegetation of polar lands, which contains many original observations, such as the abundance of *Pinus sylvestris* pollen on Spitsbergen, derived from trees on the mainland hundreds of miles to the south (p. 181), and the variability of the tundra. " Thus local edaphic or physiographic variations can ring the most immediate and fundamental changes in the local plant life." (p. 382), and " Commonly the low-arctic tundra is a mosaic" (p. 383). This account reads true. By contrast, the account of tropical vegetation contains many misleading statements from the literature : the irregular canopy, the abundance of undergrowth and of climbers which are attributed to primary forests, in reality are typical of younger forests ; climbers could not directly ascend to branches 50 ft or more above the ground unless they had grown up with the trees. True climax equatorial forests such as those of *Cynometra alexandri* in Africa, have a very different character : the canopy is even and is lower than that of secondary forest trees ; there is little undergrowth, and there are few climbers. These forests contradict many statements in the book : that root competition is not an important factor (p. 428) ; that there is often no clear dominance (p. 324) ; that there is a broad tendency from simplicity to complexity (p. 324) ; and that the number of species goes on increasing to the end (p. 464). In fact, they indicate that the same principles govern the succession of tropical vegetation as govern the succession in other regions. There are more misleading statements about grasslands : " . . . there is no such thing as ' a tropical grassland climate ' " (p. 444) ; yet in the next paragraph there is reference to places with heavy rains for 4 – 6 months of the year, during which much of the land is under water, and 6 months of drought. Is that not the climate of large stretches of African grassland inside the tropics ? In such areas, the trees are often confined to the ridges, which are never flooded, a distribution which is the reverse of the grassy ridges and wooded hollows (p. 445) frequent near the equator. And where are the tropical " grasses whose dead straw also accumulates to form a mulch " (p. 446) ? On the tops of some mountains and in the depths of some swamps, but not in ordinary grasslands. There is reference to deflected succession, to human influence in reducing forests : " Modern man is the biotic superdominant of the world," (p. 566). But it is not emphasized how long and how drastically man has been altering the vegetation of the tropics. The frontispiece " Generalized land vegetation map of the world " shows Britain, France and Germany as " Broadleaf deciduous forest" ; by analogy, most of equatorial Africa should be shown as " Broadleaf evergreen forest ". " The climax is thus an equilibrated state of community composition and productivity, that is adapted to maximum utilization of local resources by plants and, normally, animals." (p. 329) Would pasture workers agree, when the most productive grazing is often on land derived from forest ? " . . . the acidic heathlands found in many areas on both sides of the North Atlantic tend to be too poor for the growth of other than the most meagre of crops, being generally best given over to pasturage." (p. 541) How would the Danes have fared if they had been content with the poor heaths covering so much of their country ? Why do ecologists so stress the value of slow natural succession, and decry the rapid improvements produced by cultivating and fertilising the land ?

The index covers 59 pages and includes many of the ecologists' nouns like " tychoplankton ". It does not include many of the adjectives used and explained in the text, words such as " euryhaline "

and " dysphotic ". Is it really necessary to write about " aphotic bottoms " ? What is wrong with the word " dark " ? And the index does not contain the word " catena ", which is surely one of the most valuable concepts to the plant geographer, for it denotes the series of soils and plant communities, from hill top to valley bottom, repeated again and again over vast tracts of country. There are physiographic variations in the vegetation of most regions, as well as in the tundra. Might not all the adjectives, and the word "catena", be put in the index of the next edition of " Introduction to plant geography " ? For there is sure to be a great demand for a book which covers so wide a field in so pleasant a manner : plum puddings are enjoyable, even though one is allergic to some of the ingredients. This book will be of special value in the training of the next generation of ecologists ; but it is to be hoped that two points will be emphasized in that training : (1) they should not use too many long words, " It may be noted that whereas ecologists are notoriously prone to make and use technical terms . . . " (p. 335) ; (2) they should not think they know all the answers before they start work in the field, " in the life sciences our knowledge is often still no more than meagre and our understanding rudimentary . . . our analytical perception is often poor . . . " (p. 579).—A. S. Thomas.

1530† Berbecel, O. and Valuță, G. [Eds] Zonarea ecologică a plantelor agricole in R.P.R. [**Ecological zoning of crops in the Romanian Peoples' Republic.**] [Romanian] 1960, pp. 286, bibl. 164, Russian and French summaries, maps, 17 × 24 cm, Bucharest : Academy R.P.R. 18·50 Lei. [Received March, 1961]

The work reported was designed to evaluate the natural potential for agricultural products in each administrative unit of the country, to determine suitable crop rotations in the various regions, to develop cultivation measures with due regard to the soil and climate, and to introduce new crops in suitable areas. Field crops and forage crops are considered separately, and maps are supplied to show the ecological zones for each crop. The 5 ecological zones are denoted as : very favourable; favourable ; slightly favourable ; very slightly favourable and unfavourable. It is claimed that the method of study has involved an analysis and a synthesis ; this initial analysis is concerned with the plants' requirements at different growth-stages in regard to climate, and with edaphic factors, in addition to experimental data from the growing of crops in selected localities. F. Russ. s.—M.H.

1531† Norman, A. G. [Ed.] **Advances in agronomy. Vol. 11.** 1959, pp. 428, bibl. at end of chapters, illus., maps, 23·5 × 15 cm, New York : Academic Press Inc. $12.

This compilation is in 6 parts, the first of which consists of 7 papers by various authors (and coordinated by M. B. Russell) under the general subject of water and its relation to soils and crops. This part occupies more than a fourth of the book. The remaining parts include : The economics of fertilizer use in crop production, by R. D. Munson and J. P. Doll ; Recent developments in agricultural machinery, by T. W. Edminster and H. F. Miller ; Fertilizer production and technology, by K. D. Jacob ; Soils and land use in the Netherlands, by P. G. Meijers ; Effect of nitrogen on the availability of soil and fertilizer phosphorus to plants, by D. L. Grunes. [See also next abstract and *Fld Crop Abstr.* 13 : 1032.]—M.H.

1532† Norman, A. G. [Ed.] **Advances in agronomy. Vol. 12.** 1960, pp. 464, bibl. at end of chapters, illus., maps, 23·5 × 15 cm, New York : Academic Press Inc. $12·50.

A consideration of topics to be reviewed in this series should lead to a balance between professional interests in the broad field of agronomy. There should be an awareness of subjects currently moving rapidly and a judicious return, from time to time, to important topics on which the record should be brought up to date. Inevitably the final selection represents some compromises. This book contains typical examples of the pattern of articles that has been developed. One important crop, red clover, is treated comprehensively by Fergus and Hollowell ; the nutritional and physiological characteristics of another crop, soyabean, are given especially detailed review by Ohlrogge and Howell. There is a regional article, this time on the agronomy of the Southwest United States, by Fuller and his colleagues. The clay fraction in soils, which formed the subject of a major article in Volume 1, receives attention again, perhaps belatedly, in view of developments in this field. On the more applied side is a chapter on water infiltration into soils. Finally, the chapter on grass and legume seed production written by several authors and (brought together by Garrison) is an excellent example of a broad topic that is best treated by a group of agronomists. [See also previous abstract.] From preface.—M.H.

1533† Turner, B. L. **The legumes of Texas.** 1960, pp. 284, maps 178, illus., Austin, Texas : Univ. Texas Press, $6.

There were good reasons for the preparation of this book, the scope of which is shown by its title ; much of the new information presented will be invaluable in future academic and applied studies. Each of the 391 taxa of leguminous plants found in the five major floristic regions represented in Texas is described, together with its distribution in the State, and some ecological and, where appropriate, agricultural data. The Leguminosae,

treated as one family of flowering plants, are divided into three sub-families for each of which the characters of the genera and their species are systematically described. The excellent dichotomous keys, constructed by the author, for generic and specific identifications are based on vegetative, floral, and, where necessary, fruit characters. Dot maps showing species distribution have been compiled but they are not always clear, especially when two or three species are recorded on one map. Where known, chromosome numbers are listed, those for 43 species, counted by the author and his colleagues, being published for the first time. This book has been compiled meticulously and logically. Dr. Turner carefully lists the criteria used for specific and varietal distinction ; he includes synonyms from previous major works and suggests alterations in nomenclature only after detailed revisionary study of groups, unless previous names are contrary to the International Code of Botanical Nomenclature. This stimulating book, in which the one illustration is, appropriately, the official State flower of Texas, *Lupinus subcarnosus*, contains over 100 references covering a wide range of scientific study. From *Pl. Breed. Abstr.* 1961, 31 : 1162.

1534† Hanelt, P. Die Lupinen. **[Lupins.]** 1960, pp. 104, illus., Wittenberg Lutherstadt : A. Ziemsen Verlag.

Starting with an account of the taxonomy of the genus *Lupinus* and the geographical distribution of the species, this popular booklet then gives full descriptions of the most important species for agriculture, beginning with *L. albus*. In addition to the botanical descriptions, details are given on phasic development in forms of different geographical origin, on the forms considered most promising for breeding purposes and on the history of cultivation, with citations from classical and medieval authors. The first introduction of lupin cultivation in Germany, its later vicissitudes and the production of the first cultivars are described. The first sweet forms of *L. albus* were isolated in 1935, and cultivars suitable for growing in central and southern Germany are now available ; one of these, Hadmerslebener Neutra, bred at Hadmersleben in the German Democratic Republic possesses the advantage of a neutral reaction to temperature in the early growth stages. Reference is also made to some of the cultivars produced in Federal Germany, the most recent of which is Blanca. It remains, however, uncertain whether the white sweet lupin in Germany will be able to compete with the other species ; some data are given on the extent of its cultivation in other countries. Next to be described are *L. luteus* and *L. angustifolius* ; both species seem to have their centres of origin in the Mediterranean region, and reference is made to a related Mediterranean species, *L. linifolius*, which has been used in crossing with *L. angustifolius*. Brief descriptions are given also of certain species of lesser economic importance such as *L. mutabilis*, *L. polyphyllus*, *L. perennis*, *L. hirsutus*, *L. pilosus* and *L. varius*, and a key is provided for determining those species that have any agricultural interest. From *Pl. Breed. Abstr.* 1961, 31 : 1163.

1535 Medina, J. C. Plantas fibrosas da flora mundial. **[Fibre plants of the world flora.]** 1959, pp. 930, illus., Campinas, São Paulo, Brazil : Inst. Agron. [Review seen in *Riv. Agric. subtrop.* 1960, 54, No. 10–12]

1536 Hogen Esch, J. A. and others. **Dutch potato atlas.** Third supplement, 1960, illus., Wageningen, Netherlands : Veenman en Zonen, 22 × 16 cm, f. 11·25.

The third supplement of the Dutch Potato Atlas contains descriptions and illustrations of the following varieties : Aristo, Asoka, Dekama, Harli, Herkol, Pandora, Patrones and Remona. [See *Fld Crop Abstr.* 9 : 1038, 10 : 1675 and 13 : 509.] —R.B.

1537† Machlis, L. and Briggs, W. [Eds]. **Annual review of plant physiology.** Vol. 11, 1960, pp. 468, 22 × 15 cm, Palo Alto, California: Annual Reviews Inc., $7·50.

The following papers are noted : Nitrogen fixation, by C. S. Yocum ; Biosynthetic pathways of aromatic compounds, by A. C. Neish ; The relationship between salt uptake and the absorption of water by intact plants, by R. S. Russell and D. A. Barber ; Transport in the xylem, by E. G. Bollard ; Transport in the phloem, by M. H. Zimmermann; Vernalization and dormancy, by P. Chouard ; The mechanism of action of auxin, by A. W. Galston and W. K. Purves ; Primary processes of photosynthesis in plants, by A. A. Krasnovsky ; Gibberellins as native plant growth regulators, by B. O. Phinney and C. A. West.— R.H.F.

1538 Eames, A. J. **Morphology of the angiosperms.** 1961, pp. 531, bibl. 45 + bibl. at end of each chapter, illus., 23·5 × 16 cm, London : McGraw-Hill Publishing Co. Ltd., 104s. 6d.

This publication provides a reference book, at post-graduate level, concerning the origin, nature and structure of the plant organs of angiosperms. The emphasis is decidedly on reproductive organs ; whereas there is one chapter on the plant body (roots, stems, leaves) there are nine on organs whose function is reproduction : inflorescence ; flower, androecium and stamen ; pollen, pollination and male gametophyte ; the gynoecium and carpel ; the ovule ; the archesporium, embryo sac and endosperm ; fertiliza-

tion and the embryo ; the seed and fruit. The final chapters are on the morphology of selected families and the phylogeny of the angiosperms.

Though the book is primarily academic, the agrostologist will find fine details of information on the reproductive organs of some grasses, and the field-crop botanist will find information on the reproductive organs of some crop plants, e.g. *Triticum*, *Hordeum*, *Ipomoea*, *Cannabis*, *Cicer arietinum*, *Dioscorea*, *Eleusine*, and *Hibiscus*, to name a few. Throughout the text, the approach is theoretical, comparative and evolutionary rather than descriptive. To support his text the author has drawn freely on illustrations of previous authors. He also pays tribute to the understanding and interpretation of earlier generations of botanists, especially those of the mid-19th century and he attributes their soundness of judgement to the broader outlook which was possible in an age of less intense specialization. There is little documentation in the text, but each chapter has its bibliography and there is a general bibliography at the end of the book.—D. Brown.

1539† Parodi, L. R. Enciclopedia argentina de agricultura y jardinería. I. Descripción de las plantas cultivadas. [**Argentine encyclopedia of agriculture and horticulture. I. Description of the plants cultivated.**] 1959, pp. 946, illus., Buenos Aires : Editorial Acme S.A.C.I., $28·50.

The first volume of the encyclopaedia contains descriptions of over 2700 species of plants cultivated in the Argentine Republic, some 600 of them being illustrated by line drawings. The volume begins with an explanation of the basic principles of botanical taxonomy, in which unfortunately the use of the cultivar is explained incorrectly. The plants are arranged according to families, based on Engler-Gilg (1936), and a key for their identification precedes the descriptions. There are also keys for the determination of the genera within each family and the species within each genus ; where botanical varieties exist within the species they are also described. Indications are given of the common Spanish and local names where such exist, and there is an index in which both Latin and Spanish names are listed alphabetically. There is also a glossary of some, though not all, the botanical words employed, and a selected bibliography. From *Pl. Breed. Abstr.* 1961, 31 : 1159.

1540† Kotov, M. I. [Ed.] [**Flora of the Ukraine, Vol. 10.**] [Ukrainian] 1961, pp. 491, illus. 17 × 25 cm, Kiev : Acad. Sci. Uk. RSR.

See also *Fld Crop Abstr.* 14 : 537.

1541† Frear, D. E. H. [Ed.] **Pesticide handbook 1960.** 12th edn, 1960, pp. 265, 23 × 15 cm, State College, Pa : Coll. Sci. Publishers, $3·25 (cloth), $1·75 (paper).

The trade names, ingredients (also compatibility and toxicity of the active constituent), uses and manufacturers of 7851 products are listed. —R.H.F.

1542† Davydov, N. N. **Botanical dictionary. Russian—English—German—French—Latin.** 1960, pp. 335, Moscow : Foreign Language Sci. Tech. Dictionaries, Fizmatgiz, 14 × 21 cm, 11 roubles, 55 copecks.

1543† FAO/FEZ. **Vocabulary of animal husbandry terms. [English, French, Spanish and German.]** 1959, pp. approx. 450, 28 × 20·5 cm, Rome : FAO and Féd. Europ. Zootech. [Received April, 1961]

NEWS AND NOTES

International

1544 Seed Exchange. The activities in seed exchange of the Crop Production and Improvement Branch, FAO, from Aug. 1960 to Feb. 1961 are shown in *Pl. Introd. News Lett.* of March 1961. The seeds exchanged include those of many field crops.—E.B.O.

1545† Radioactive Materials in Food. An FAO Expert Committee on Radioactive Materials in Food and Agriculture met in Rome from 30 Nov. to 11 Dec. 1959 with the object of : (a) reviewing present knowledge on the behaviour of radioactive substances in terrestrial and aquatic food chains ; (b) indicating possible improvements in surveys of radioactive substances in food and agricultural materials ; and (c) making recommendations on research aiming at reducing the radioactive contamination of human food. A summary of the conclusions and the recommendations of the Committee are given in *Atom. Energy Ser. 2 FAO* 1960.—E.B.O.

Great Britain

1546 Commonwealth Agricultural Bureaux. Sir Thomas Scrivenor C.M.G. was recently appointed Secretary of the Commonwealth Agricultural Bureaux organization and assumed duty on 10 April 1961.—A.G.G.H.

1547 Tropical Agriculture. An open meeting was held at Uganda House, Trafalgar Square, London, 21 July

1961, under the auspices of the ICTA Association (UK). The theme was the impact of science on tropical agriculture. —R.H.F.

1548 SUGAR-BEET. Research work on sugar-beet will be carried out at Broom's Barn, a 190-acre experimental station at Barrow near Bury St. Edmunds. The Sugar Beet Research and Education Committee has made a grant to the Lawes Trust (which adminsters Rothamsted Exptl Sta.) to enable it to buy the land. From *Sugar Beet Suppl.* to *Fmg World*, 20 April 1961.—C.L.S.

1549 WEED RESEARCH, the official organ of the European Weed Research Council, the first issue of which appeared in March, 1961, is a quarterly international journal containing papers in English, French and German on the study of weeds and their control and on related topics, together with reviews of technical conferences and symposia. Papers are accepted on work carried out in any part of the world. The journal is edited by J. D. Fryer, A.R.C. Weed Research Organization, Begbroke Hill, Kidlington, Oxford, and is published by Blackwell Scientific Publications, Oxford, price 25s. per copy, annual subscription 80s. or $14.— *Weed Res.* 1961, Vol. 1, No. 1.—R.B.

1550 COUCH GRASS [*Agropyron repens*]. One inch of rhizome in March grew to nearly 5 ft by July, and a total length of over 100 miles of rhizome was recorded from 1 acre of an infested field. *Rep. W. Scot. agric. Coll. 1959-1960.* —R.H.F.

France

1551 SEEDS. On the occasion of the World Seed Year 1961, organized by FAO, a special number of *Bulletin Technique d'Information* (No. 157, 1961) was devoted to seeds. It deals with the work on crop improvement, the regulations governing varieties, the production and trade in seeds, and the economic importance of the seed trade in France. The contributions by specialists in the various fields are grouped under (1) selection and (2) seed production. The latter section includes the following articles : Production and control of seed potatoes, by R. Barbier ; Certification of forage seeds, by J. Rebischung and Y. Demarly ; Production and certification of maize seed in France, by R. Bonte ; Production and certification of oil-crop seeds, by A. Roulland ; Production and certification of flax seed in France, by R. Bonte ; Control of cereal seeds, by E. David.—E.B.O.

Italy

1552 THE FIRST NATIONAL MEETING ON SELECTED SEEDS was held at Lonigo, near Vicenza on 7 June, 1959, with the object of examining and discussing all aspects of seed production and trade. The papers presented, published in *Genetica Agraria* 1960, Vol. 12, No. 1–2, were concerned particularly with the seeds of wheat, maize, rice, forage crops, oil crops, and sugar-beet, and with seed potatoes.— E.B.O.

1553 WEEDS. *Agricoltura* of March, 1961, contains the following articles : Weed associations in wheat, by A. Pignatti ; New aspects of chemical weed control in wheat, by L. Chiapparini ; Weed associations in rice (bibl. 27), by R. Tomaselli ; Selective weed control in rice, by E. Baldacci ; Weeds and weed control in maize, by P. Grancini.—E.B.O.

Somalia

1554 AGRICULTURE. A double number of *Rivista di Agricoltura subtropicale e tropicale* 1960, 54, No. 4–6 and 7–9 is devoted entirely to the agriculture and livestock industry of Somalia and is intended to mark the end of the Italian mandate in that country. The aspects considered in the various articles include : climate, water resources, irrigation, land reclamation, agricultural production and maize cultivation. A bibliography is given containing about 300 references to papers related to agriculture in Somalia and published during 1950–60.—E.B.O.

Union of South Africa

1555 KENAF (*Hibiscus cannabinus*). A large commercial-fibre research project is being undertaken at Roodeplaat by the Director, Transvaal Region of the Department of Agricultural Technical Services. Over 450 varieties of kenaf are being tested. Fresh water in raised channels 500 ft long is used for retting. It is considered that kenaf has a good future as a rotation crop over a wide area of Natal and the Transvaal and as a source of fibre for sacks. *Fmg in S. Afr.* April 1961.—R.H.F.

Japan

1556 RICE STORAGE. Refrigerated rice warehouses have increased in number steadily and in June 1960 totalled 58. Their total floor space was 37,000 m^2 and their storage capacity 68,000 tons, which was less than 1% of the total storage capacity (8·5 million tons) under government control. In these warehouses the temperature ranges from 5° to 30°C and the relative humidity from 60 to 80%. In 1959, the Food Research Institute of the Food Agency studied the chemical changes, the changes in palatability and the fungal infestation in rice stored at 13°C and 70% relative humidity, compared with rice stored under natural conditions. In rice stored at low temperature, the activity of the various enzymes decreased little, the germinating capacity after 1 yr was about 80% (similar to that of fresh rice), the starch viscosity and the reducing sugar showed no significant increase, the properties of the water-soluble protein showed little or no change, and cooking qualities remained about the same as at the beginning of storage. The decrease in thiamine content was 20% in rice stored under refrigeration and 40% in non-refrigerated rice. After 1 yr, acidity had increased by 20–30% under both refrigeration and natural conditions, while the number of grains damaged by fungi had not increased in refrigerated rice but had increased under natural conditions. [See *Fld Crop Abstr.* 14 : 551.] *Grain Storage News Lett.* Jan. 1961.—E.B.O.

USA

1557† SEED GERMINATION TESTS. To help the co-ordination of research on seed-germination testing procedures, the Research Committee of the Association of Official Seed Analysts has prepared a list of recommended temperatures

and ranges of temperature at which tests should be made. *Proc. Ass. off. Seed Anal. N. Amer.* June 1960.—R.H.F.

1558 MULTIPLE-EARED MAIZE. At Crow's Hybrid Corn Co., Milford, Ill., a multiple-eared maize has been developed from a *Zea mays* × [*Euchlaena mexicana*] teosinte cross. A single plant may bear up to 11 ears from several tillers. This interspecific hybrid is particularly suited to combine harvesting since the moisture content of its smaller ears tends to be lower than those of standard hybrid maize. *Seed World* 10 Feb. 1961.—R.H.F.

1559 THE INSECTICIDE SEVIN has been passed by the USDA for the control of *Heliothis zea* and *Pyrausta nubilalis* on maize and sweet corn. *Fm Chem.* April 1961.—R.H.F.

1560 GRAIN STORAGE IN PLASTIC BAGS. A new system of grain storage is being tried on a limited commercial scale. A pneumatic grain-handling machine blows the grain into plastic containers made of koroseal vinyl, of 5000 to 50,000 bu capacity. When these are filled with grain, the air flow of the machine is reversed, and enough air is removed to create a partial vacuum. By reducing the amount of 0_2 in the container, one of the requirements for the multiplication of insects and fungi is partially eliminated. The plastic bags can be used for storage under- or above-ground. For above-ground storage, sand to a depth of a few inches on level ground makes a satisfactory base for the bag. *Grain Storage News Lett.* Jan. 1961.—E.B.O.

1561 POTATO STORAGE. The herbicide CIPC [chlorpropham] applied as a 0·25 – 0·5% spray or dip inhibits sprouting and so enables potatoes to be stored at 55°F for up to a year. *Amer. Potato J.* Sept. 1960.—R.H.F.

Brazil

1562† THE ORGANIZATION OF AGRICULTURAL RESEARCH is described by A. B. Fagundes, director of the Conselho Nacional de Desenvolvimento Econômico, in *Riv. Agric. subtrop.* for Oct.–Dec. 1959. The Institutes concerned in this research come directly under the Federal Government or the administration of the various States ; a few are maintained by private bodies.—E.B.O.

Australia

1563† AUSTRALIAN JOURNAL OF EXPERIMENTAL AGRICULTURE AND ANIMAL HUSBANDRY. The first number of this quarterly journal, edited by R. N. Sandiford, appeared in May 1961. It contains articles on field-crop, herbage and livestock investigations of an experimental nature. It is published by the Australian Institute of Agricultural Science, 226 Clarendon Street, East Melbourne, C.2, Victoria, and costs £A5 per year, post free.—R.B.

South Pacific

1564 PLANT INTRODUCTION. The plant material distributed to various territories by the Plant Collection and Introduction Service of the South Pacific Commission included : *Colocasia esculenta*, *Dioscorea alata*, *Phaseolus* spp., *Sorghum almum* and *Xanthosoma sagittifolium*.—E.B.O.

Enquiries received

1565 Arising from enquiries received by this Bureau from April to June 1961, bibliographies on the following subjects were prepared and are available on request from the Director. S.762. Cereals, effect of sowing date on yields in the U.K. (12 refs) ; S.752. Maize, effects of fertilizers, population and drought on number of days from sowing to flowering (12 refs) ; S.738. Maize, *Striga* infestation (6 refs) ; S.751. Root crops, plant populations and their effect on quality and yield (54 refs) ; S.741. Potatoes, unpublished theses in Libraries of Universities of the British Isles (22 refs) ; S.755. Cotton, data on minimum temperature requirements, (21 refs) ; S.757. Oil-seed rape, effect of variety and nitrogen fertilization (24 refs).—D.B.